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Benj. Franklin

AMERICAN
DICTIONARY OF PRINTING
AND
BOOKMAKING,

CONTAINING

A HISTORY OF THESE ARTS IN EUROPE AND AMERICA, WITH
DEFINITIONS OF TECHNICAL TERMS AND
BIOGRAPHICAL SKETCHES.

ILLUSTRATED.

NEW YORK:
HOWARD LOCKWOOD & CO., PUBLISHERS.
1894.

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PREFACE.

THIS book is an attempt to show both the present and past conditions of the printer's and bookmaker's arts, with other matters related thereto, in a form convenient for reference. It contains a greater quantity of interesting and valuable matter upon the subjects than any preceding work, of whatever kind or nature. Each topic has been fully and thoughtfully elucidated.

Several dictionaries of printing antedate this. Those of Savage, Ringwalt and Southward in English, and Waldow in German, are all valuable; but, as in the history of English lexicography, the later books had an advantage over the earlier, both as to plan and in matter, so this work has been able to profit by their strong points and avoid their defects. There is now a continual succession of writers upon typography, some dealing with its practical aspects and others with its historical and antiquarian relations. Much is now contributed to the trade press. More than a hundred volumes of such newspapers have been read, and their valuable articles have been summarized for this dictionary. Together with these, a multitude of minor pamphlets, trade announcements and other publications have been consulted.

Among the authorities which have been particularly valuable but are not mentioned above are Hansard's "Typographia," Reed's "Old English Letter Foundries," Timperley's "Encyclopædia," North's "Report," Hudson's "History of Journalism," Southward's "Typographia," De Vinne's "Invention of Printing," De Vinne's "Price-List," Thomas's "History of Printing," Faulmann's "Buchdruckerkunst," Jacobi's "Vocabulary," Greswell's "Annals of

Parisian Typography" and. Earhart's "Color Printer." In addition, the unequaled collection of the Typothetæ of New York has been continually consulted. Zaehnsdorf's treatise upon bookbinding has been freely used. On the whole, little has been found in German, French and Italian books which is valuable to American readers, except historically.

A large number of the articles treat of questions which relate to the master printer only. Hansard is the only writer who has discussed prices or cost, the methods of economy, or the finances of printing and publishing. Printing is not only an art: it is a manufacture; and he who succeeds in it only as an artist, but does not know how to buy his supplies as cheaply as the market will warrant, to sell his out-turn at a price beyond that of production, and to keep his accounts clearly and correctly, will soon cease to produce good work, and will then sink to a very low level or fall into the hands of his creditors. Herein will be found the first statement, in other than an ephemeral form, of what principles should guide the employing printer, and how he may know that he has been conducting his business on true lines. The remorseless competition of the present day demands that he who succeeds shall be a good commercial man; that he shall watch over his expenses; produce his work so that it shall be pleasing to the eye, and collect his bills promptly. Much on this subject will be found.

The apprentice and the journeyman have not been neglected.

Each of the simple operations is described, with the reasons for doing the work in the manner set forth; some, as for instance Making Ready, are given with a fullness never before attempted. Under the heads Type, Type-Founding, Electrotyping and Bookbinding, many subsidiary arts are described at length. Under International Typographical Union, New York, and Trades-Union, a more extended account is given of workmen's societies among printers than is elsewhere to be found. A history of the Typothetæ is also given.

The vocabulary relating to the arts is fuller than has heretofore been given. Attempts have been made to collect such words ever since the time of Moxon, now a little over two centuries ago, but they have not all yet been brought together. New terms are continually being created, and these with those of four other languages have also been incorporated. The Spanish words concerning typography have been compiled by James Cooper; those in French are taken from Crapelet, Didot and Daupeley-Gouverneur; the

Italian are from the work of Pozzoli, and German technical phrases are drawn from Bachmann, Waldow and Franke. In no respect have ordinary bi-lingual dictionaries been more unsatisfactory than in the explanation of technical terms.

Much space has been given to historical and biographical matter. Beginning with the invention of the art, the changes and improvements in each line down to the present day have been told. Part of this is given under countries and cities; part under machines or new processes; but a very large part under biographical notices. The latter have been illustrated wherever practicable. The biographies of people who have lived or are now living in the United States are particularly numerous. They include the officers of the Typothetæ and the presidents of the International Union, besides the most prominent inventors, type-founders and printing-machine makers, with a multitude of others who have attained distinction in some one of the arts. Not one has been inserted for personal reasons.

When the plan of this dictionary was submitted by W. W. Pasko to the late Howard Lockwood it was considered by the latter for a long time. This was his custom. He decided no important question in haste. Nothing was said for years, but when the firm finally decided to enter upon its publication it was warmly taken up. An agreement was made with Mr. Pasko to prepare the work and carry it to completion within four years. Mr. Lockwood scrutinized all of the proofs, and entered into all details with great interest. When, in October, 1892, it reached the letter L he was urged to allow a sketch of himself to be prepared and used. He shrunk from this, with the modesty inherent in his nature, but finally consented. A brief notice was made ready and given to him, that it might be revised as to dates and names. He did not return it. Presently all the type in the font was set up, leaving a gap under "Lo." Work ceased. Thus it stood when his sudden death came. The bit of copy which had not been returned was never found; the article about him now in the book was afterwards written, and the work proceeded.

Much obligation must be expressed to Theodore Low De Vinne, the great printer, for his kindly assistance, his indication of authorities, his decision of knotty questions, his loan of illustrations, and his permission to borrow freely from his two principal books, the "Invention of Printing" and the "Printers' Price-List." Obligations are also due to James A. Colvin, managing editor of the Lockwood Press, for revision of manuscript; to James Cooper, who contributed the valuable articles on Portugal, Portuguese Language, Spanish Language and Spanish Printing—and, in addition, rendered much service in reading the proofs of the entire book; to James H. Ferguson, who gave much assistance in the article on Electrotyping; to the late David Bruce, who contributed valuable information relating to type-founding and to early New York and Philadelphia printers; to J. Stearns Cushing, of Boston; to John F. Earhart, of Cincinnati; to James W. Pratt and John Polhemus, of New York, for full and explicit information upon doubtful points; and to William Pinkney Hamilton, the managing partner of the publishers, for the care, interest and enterprise with which he has carried out the original ideas of the firm. The mechanical part of the work shows care and accuracy, and is in the highest degree creditable to those who produced it.

AMERICAN DICTIONARY

OF

PRINTING AND BOOKMAKING.

A THE first letter in almost all languages, is one of those most commonly used. In English only two letters exceed it in frequency. In the case it is nearest to the right hand. In job fonts it is taken as the measure of their magnitude, as 4A, 5A, 10A, meaning that number of letters which would require four, five or ten capital A's to be in due proportion to the rest of the font. This also occurs as 3A, 6a, meaning the proportion of lower-case and capital letters. It is the first signature in a book, but its mark is nearly always suppressed, as the letter would come at the foot of the title-page and would be unsightly. In a daily newspaper office, where the articles are numbered by letters, the one marked A is the first to go out when composition begins, the takes being numbered 1a, 2a, 3a and so on. There are a great variety of accents to A. As the mark of the passive participle in English of the last century and earlier it takes a hyphen after it, as a-building, a-riding, a-going, but when it is a preposition, as in afoot, asleep, it unites with the succeeding word. In form the small a is one of the most irregular of all letters. Among the Greeks a stood for 1, but with the Romans for 500. A is the sixth note of the natural scale, and a denotes the same interval in the second octave. With a line above ā shows the same in the next octave still, and with two lines in the second octave. To distinguish them they are known as the one-lined octave, two-lined octave, and so on. In music a figure prefixed to a vocal composition indicates the number of voices it is intended for, as A3, where three voices are needed. A enters into many abbreviations. With a line around it, @, it is known as commercial a, and signifies to or at, generally the former in American offices.

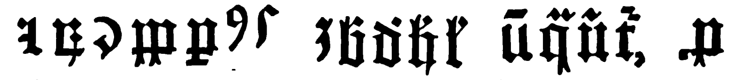
Abattre la Garniture (Fr.).—To unlock, to loosen the furniture.

Abbassamento del Timpano (Ital.).—Flying the frisket.

Abbildung (Ger.).—A cut, delineation or picture.

Abbonati (Ital.).—Subscribers to a newspaper.

Abbreviations.—The omission of a letter or letters, or the use of an arbitrary mark to denote an omission, so that the word may be shortened in writing or printing. Moxon gives the following as his definition: "Abbreviations are characters, or else marks on letters, to signify either a word or a syllable. & is the character for and, y^e is the abbreviated, y^t is that abbreviated, and several other such. Straight strokes over any of the vowels abbreviate m or n. They have been much used by printers in old times to shorten or get in matter; but now are wholly left off as obsolete." The tendency to shorten words in this way has existed from the beginning of writing. It was never so easy to write upon parchment or papyrus as it later came to be upon paper, and the introduction of smooth, glossy paper, and pens made by machinery, has still further lessened the desire for abbreviations. The tendency of printing has been to reduce the necessity for contractions; for although there was a certain advantage occasionally to the compositor in thus diminishing his space, the practice decreased the legibility of his matter, and gradually the custom has been done away with. Hebrew, Arabic, Armenian, Persian or Coptic contractions have never been anything that the compositor needed to know about, as in case any of them or those in any other Oriental language were to be used there was always an author or an editor to explain what was wanted. This is not the case, however, in Latin, nor has it been so with the living languages of Europe. Copy may have, illegibly written, d. c., u. s. w., D. v., s. a., or a thousand other expressions, and yet from it the compositor is expected to make sense. In Latin these perversions were the most marked, although the arbitrary contractions in Greek were the most numerous. Our earliest manuscripts of the Bible date back to the fourth century; in classical literature the originals are considerably younger, while the oldest writings, like the papyri of Herculaneum and Pompeii, only ascend to the Christian era. We have seals and inscriptions on metal, and mortuary and triumphal columns, where a greater antiquity is shown, but from the fact that their superscriptions were made by the chisel or the graver more care was exercised than with the pen, and the contractions are comparatively few and less arbitrary. Yet even at this time they were used, as on the signet copied in Hansard, which shows that printing, to a certain extent, was known to the ancients. The device ran thus: "CICAECILI HERMIAE, SN." By the modern method it would read: "C. I. CÆCILII HERMIÆ SIGNUM," and at length "Caii Julii Cæcilii Hermiæ Signum." When this is translated it means the seal of Caius Julius Cæcilius Hermias. Latin literature after the second and third centuries ceased to be original, and those who loved it were forced to depend upon the copies of old works made by scribes to gratify their tastes. As soon as Christianity attained the upper hand over paganism there were copies of the Scriptures to be made, as well as of the treatises explaining doctrines or doubtful points. There was also something to be done in law and medicine. After the sixth century the world seemed sunk into darkness, and the monks took the place of the slaves who formerly had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Contractions.
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ABBREVIATIONS IN THE BIBLE OF THIRTY-SIX LINES.

copied for publishers. With each decline of intelligence the copying became more and more mechanical, and each writer sought to save himself all the labor he could. Single books took years to finish. The contractions were of several classes. The one which remained longest was to make a stroke over the m or n, to indicate that the letter should be doubled, but that there was not room enough. The ending conjunction, as in arma virumque cano, was shortened so that it read arma virumq ; cano. Such contractions have continued nearly up to our day, and the short et, &, is still used. Some books were extremely abbreviated. Thus in an old work published in 1448, La Logique d'Okam, there is scarcely a single word which is not cut short. One passage reads thus : "Sic hic e fal sm qd ad simplr a e pducibile a Deo g a e & sir hic a n e g a n e pducibile a Do." There is a mark of abbreviation over nearly all these words, which it is not necessary to reproduce, as modern foundries do not have it. The whole sentence reads when turned into current Latin : "Sicut hic est fallacia secundum quid ad simpliciter ; A est producibile a Deo ; ergo A est. Et similiter hic. A non est ; ergo A non est producibile a Deo." On the previous page is an example of some of the abbreviations used in the Bible of thirty-six lines, printed at Mentz shortly after 1450. In 1475 a printer of Lubec said, in commendation of one of his own books, that he had made free use of abbreviations to get the whole work in one volume instead of two—a procedure, he thought, that deserved special praise, for he said that the contractions made the work more readable. In 1498 John Petit, of Paris, published a dictionary which professed to be a Guide to the Reading of Abbreviations. It was not published too soon, for the practice of making contractions had increased to such an extent that books with abbreviations were legible only to experts. Contractions then seemed to some extent necessary on account of the high price of paper and vellum compared with that of labor, and this great cost also explains the scant margins.

Many of the accented letters come from the desire of the calligrapher to avoid writing the right letters at length, the printer following the fashion set. Thus in German the two dots over a vowel indicate the omission of the letter e. Goethe is as correctly spelled Göthe as the other way, although the former is the usual method, and übel (evil) may be and is spelled when accents cannot be obtained as uebel. In French même (even) was once spelled mesme, and école (school) was escole. The abbreviations in Greek were very numerous, so that a full case had more than seven hundred sorts. In medicine contractions were purposely made misleading, as "ne tr. s. num.," ne tradas sine nummo, do not deliver without the money ; p. for weight ; p. r. n., according to the nature of the thing ; v. o. s., dissolved in the yolk of an egg. For the past two centuries, since printing has been free in England and its colonies, the tendency has been to lessen the number of abbreviations of common things, but the increase of offices, societies and special trades has rather lengthened the list than decreased it. There are hundreds of officers in the United States who have titles unknown when we were colonies ; such as senator, president and elector. Nearly all have some kind of abbreviation. The A. B. F. M. is an instance of a society, and G. W. P. S. O. T. of an officer in a society. In general it may be said that abbreviations should be avoided ; that they should be made from distinctive words and not from those common to other phrases ; and that a short abbreviation is preferable to a long one, if equal clearness is preserved. Miss. is not a good abbreviation for Missouri, as that combination is already appropriated to Mississippi. Most abbreviations of titles and offices are capitalized, whether they are so in the original or not, but there are a few which are put by some printers in small capitals, as Louis XIV., A. M. and P. M. A usage has sprung up of taking out the spaces between letters used as abbreviations, thus making them appear as one word, thus : D.C.L., A.D.C., A.U.C. But this usage is not sustained by the majority of offices, and even in those where it is it is sometimes violated for the convenience of spacing. The period is the usual mark of abbreviation, but in Scotland and in one widely-known newspaper in Springfield, Mass., the full point is left out after Mr, Dr, and Mrs. When the mark of abbreviation, a period, comes at the end of a sentence it is not necessary to have another period to indicate its close, yet this may sometimes happen to prevent confusion, as "The King of France conferred the highest order he had upon him (November 11, 1479, O. S.)." A mark occasionally used for this purpose is a colon. Gerrit Smith, who has been dead less than a score of years, always abbreviated Col: Gen: Adm: as given. An apostrophe is used to indicate an elision, but can never be used to show that any letters are omitted from the end, except in pronunciation. Readers of Thackeray will remember that he indicated the popular Parisian pronunciation of French, in which the final letter is dropped entirely, by the apostrophe, which he placed where the letter should be. Thus he wrote pauv' for pauvre, petit' for petite, chamb' for chambre. The same usage exists in English in regard to pronunciation, as peekin' for peeking, wringin' for wringing. A celebrated character among the "sports" of New York wrote several hundred columns of recollections, or they were written for him, in which it was attempted to reproduce his language with phonographic accuracy, and throughout the whole the final g in ing was dropped and an apostrophe substituted. When one or two letters are left out of a word, as in att'y, the apostrophe is proper, but the period could be used instead at the end. Some abbreviations are arbitrary, and it cannot now be stated why they were adopted, and others are very singular ones, such as MM. for messieurs ; ca. sa., a legal writ ; LL. D., doctor of laws ; ij, two ; and ss., to wit. A method of making abbreviations formerly in use was by using y for th. and then putting the last letter of the word at the top of the line in a smaller size, as y^{t}, that ; y^{e}, the. Sometimes in old books another kind of abbreviation is thus shown, as L^{p} or L^{ship} for lordship, K^{g} for king, A^{nn} Dom^{n} for Anno Domini. This method is common in French. It is correct in that language to write M^{me} for madame, M^{lle} for mademoiselle, or M^{gr} for monseigneur, and this rule extends through a large number of words. Where the abbreviations by superior letters are thus shown no period is required. This use of superiors is happily discountenanced in English, as the letters would require justifying in. Omissions for the sake of avoiding a libel suit or persecutions by those in power were formerly made by a dash or stars, as L—— G———n, or the E*** of B**e, for Lord Godolphin or the Earl of Bute, but these cannot properly be called abbreviations.

There are numerous abbreviations in the literary languages of Europe. Those from French and German which are used occasionally in English composition are noted in this work, as well as a few from Italian, Spanish and Dutch. The list also includes many Latin ones. The Greek contractions are no longer shown, except in books which profess to teach how to read ancient Greek manuscripts and books, and while there are a very few in current use in volumes in that language it is not necessary for the compositor to know them. Let him rely upon his author's manuscript.

There are certain abbreviations used in printing-offices which are regarded in the places where they are employed as of the utmost importance. They are directions to the foreman of a daily paper respecting the classification and insertion of advertisements. They take no period, and are run into each other. The days of the week are "Sun, Mon, Tu, Wed, Th, Fr, Sa ;"

till forbid is "tf," paid is *, "eod" is every other day, "ja" is January, and the other months are similarly abbreviated. Thus "fe7eodtf" is February 7, every other day till forbidden; "TuTh&Satde7*" is Tuesday, Thursday and Saturday till December 7, paid. It ought to be possible in any office to avoid the use of these indications. They disclose too much to outsiders, and they show very little knowledge of bookkeeping.

The following is a list of the most common abbreviations:

A.—Acting; afternoon; acre; adjective; accepted; Aulus; answer.
A. A. G.—Assistant adjutant-general.
A. A. P. S.—American Association for the Promotion of Science.
A. A. S.—Academiæ Americanæ Socius (Fellow of the American Academy) [of Arts and Sciences].
A. A. S. S.—Americanæ Antiquarianæ Societatis Socius (Member of the American Antiquarian Society).
A. B.—Artium Baccalaureus (Bachelor of Arts).
Abbr.—Abbreviated.
A. B. C. F. M.—American Board of Commissioners for Foreign Missions.
Abl.—Ablative.
Abp.—Archbishop.
Abr.—Abridged.
A. B. S.—American Bible Society.
A. C.—Ante Christum (before the birth of Christ); archchancellor.
Acc.—Accusative.
Acct.—Account.
A. D.—Anno Domini (in the year of our Lord).
A. D. C.—Aide-de-camp.
Adj.—Adjective.
Adjt.—Adjutant.
Adjt. Gen.—Adjutant-general.
Ad lib.—Ad libitum (at pleasure).
Admrs.—Administrators.
Admx.—Administratrix.
Adv.—Ad valorem (at [or on] the value); adverb.
Æt.—Ætatis (of age; aged).
A. F. B. S.—American and Foreign Bible Society.
A. G.—Adjutant-general.
Ag.—Argentum (silver).
A. G. S. S.—American Geographical and Statistical Society.
Agt.—Agent.
A. H.—Anno Hegiræ (in the year of the Hegira).
Al.—Alaska.
Ala.—Alabama.
Ald.—Alderman.
Alex.—Alexander.
Alt.—Altitude.
A. M.—Artium Magister (Master of Arts); anno mundi (in the year of the world); ante meridiem (before noon).
Amer.—American.
Amt.—Amount.
Ana.—Of each a like quantity.
An. A. C.—Anno ante Christum (in the year before Christ).
Anat.—Anatomy.
Anc.—Ancient; anciently.
And.—Andrew.
Ang. Sax.—Anglo-Saxon.
Anon.—Anonymous.
Anth.—Anthony.
Antiq.—Antiquities.
Aor.—Aorist.
Apo.—Apogee.
Apoc.—Apocalypse.
App.—Appendix.
Apr.—April.
A. Q. M. G.—Assistant quartermaster-general.
Arch.—Archibald; architect.
Arg.—Argumento (by an argument drawn from such a law).
Arith.—Arithmetic.
Ariz.—Arizona.
Ark.—Arkansas.
A. R. S. S.—Antiquariorum Regiæ Societatis Socius (Fellow of the Royal Society of Antiquaries).
Art.—Article.
A. S. or Assist. Sec.—Assistant secretary.
A. S. S. U.—American Sunday-School Union.
Astrol.—Astrology.
Astron.—Astronomy.
A. T. S.—American Tract Society.
Atty.—Attorney.
Atty. Gen.—Attorney-general.
A. U. A.—American Unitarian Association.
A. U. C.—Anno urbis conditæ; or, Ab urbe conditâ (in the year from the building of the city [Rome]).
Aug.—August; Augustus.
Aur.—Aurum (gold).
Auth. Ver.—Authorized Version [of the Bible].
A. V.—Authorized Version [of the Bible].
Av.—Average; avenue.
Avoir.—Avoirdupois.
B.—Born.
B. A.—Artium Baccalaureus (Bachelor of Arts).
Bal.—Balance.
Balt.—Baltimore.
Bar.—Baruch.
Bart.—Baronet.
Bbl.—Barrel.
B. C.—Before Christ.
B. C. L.—Bachelor of Civil Law.
B. D.—Baccalaureus Divinitatis (Bachelor of Divinity).
Bds. or bds.—Boards [bound in].
Belg.—Belgium.
Benj.—Benjamin.
Bk.—Book; bank.
B. M.—Baccalaureus Medicinæ (Bachelor of Medicine).
Bost.—Boston.
Bot.—Botany.
Bp.—Bishop.
Br.—Brother.
Brig.—Brigade; brigadier.
Brig. Gen.—Brigadier-general.
Brit. Mus.—British Museum.
Bro.—Brother.
Br. Univ.—Brown University.
B.S.—Bachelor in the Sciences.
Bt.—Baronet.
Bush.—Bushel.
B. V.—Beata Virgo (Blessed Virgin); bene vale (farewell).
C.—Caius; cent.
C., Ch. or Chap.—Chapter.
C. or Cent.—Centum (a hundred or cental).
Cæt. par.—Cæteris paribus (other things being equal).
Cal.—Calendis (the first day of the month); California; calends.
Cal. Rot. Pat.—Calendarium Rotulorum Patentium (Calendar of the Patent Rolls).
Can.—Canon; Canada.
Cant.—Canticles.
Cap.—Caput, capitulum (chapter).
Caps.—Capitals.
Capt.—Captain.
Capt. Gen.—Captain-general.
Ca. resp.—Capias ad respondendum (a legal writ).
Ca. sa.—Capias ad satisfaciendum (a legal writ).
Cash.—Cashier.
Cath.—Catharine.
C. B.—Companion of the Bath.
C. E.—Canada East; civil engineer.
Cel. or Celt.—Celtic.
Cf.—Confer; compare.
C. G.—Commissary-general; consul-general.
C. H.—Court-house.
Ch.—Church; Charles; chapter.
Chanc.—Chancellor.
Chap.—Chapter.
Chas.—Charles.
Chem.—Chemistry.
Chr.—Christopher.
Cin.—Cincinnati.
C. J.—Chief-justice.
Clk.—Clerk; a clergyman.
C. M.—Common metre.
Co.—Company; county.
Coch.—A spoonful.
C. O. D.—Cash (or collect) on delivery.
Col.—Colorado; colonel; Colossians; collega; collegium.
Coll.—Collector; colloquial; college; collection.
Com.—Commerce; committee; commentary; commissioner; commodore.
Com. Arr.—Committee of arrangements.
Comdg.—Commanding.
Comm.—Commentary.
Comp.—Compare; compound.
Com. Ver.—Common Version [of the Bible].
Con.—Contra, against; in opposition.
Con. Cr.—Contra credit; creditor.
Conch.—Conchology.
Cong.—Congress.
Conj.—Conjunction.
Conn. or Ct.—Connecticut.
Const.—Constable; constitution.
Cont.—Contra.
Cor.—Corinthians.
Cor. Sec.—Corresponding secretary.
Crim. Con.—Criminal conversation; adultery.
C. S.—Custos Sigilli (Keeper of the Seal); court of sessions.
Ct., cts.—Cent; cents.
C. W.—Canada West.
Cwt.—Hundredweight.
Cyc.—Cyclopædia.
D.—Denarius or Denarii (penny or pence); died; five hundred.
Dan.—Daniel; Danish.
Dat.—Dative.
D. C.—Da Capo (again); District of Columbia.
D. C. L.—Doctor of Civil Law.
D. D.—Divinitatis Doctor (Doctor in Divinity).
Dea.—Deacon.
Dec.—December; declination.
Deg.—Degree or degrees.
Del.—Delaware; delegate; delineavit (he [or she] drew it).
Dep.—Deputy.
Dept.—Department; deponent.
Deut.—Deuteronomy.
Dft. or Deft.—Defendant.
D. G.—Deo Gratias (thanks to God); Dei Gratiâ (by the grace of God).
Diam.—Diameter.
Dict.—Dictator; dictionary.
Dim.—Diminutive.
Disc.—Discount.
Diss.—Dissertation.
Dist.—District.
Dist. Atty.—District-attorney.
D. M.—Doctor of Music.
Do.—Ditto (the same).
D. O. M.—Deo Optimo Maximo (To God, the best, the greatest).
Doz.—Dozen.
D. P.—Doctor of Philosophy.
Dr.—Doctor; debtor.
D. S.—Dal Segno (from the sign).
D. T.—Doctor Theologiæ (Doctor of Divinity).
D. V.—Deo Volente (God willing).
Dwt.—Pennyweight.
E.—East.
Ea.—Each.
E. and O. E.—Errors and omissions excepted.
Eben.—Ebenezer.
E. by S.—East by south.
Eccl.—Ecclesiastes.
Ecclus.—Ecclesiasticus.
Ed.—Editor; edition; eds., editors.
Edm.—Edmund.
Edw.—Edward.
E. E.—Errors excepted.
E. g.—Exempli gratiâ (as for example); ex grege (among the rest [literally from the flock]).
E. I.—East Indies or East India.
E. Lon.—East longitude.
Eliz.—Elizabeth.
Encyc.—Encyclopædia.
E. N. E.—East-north-east.
Eng.—England; English; engraver.
Env. Ext.—Envoy extraordinary.
Ep.—Epistle; epistola.
Eph.—Ephesians; Ephraim.
Esd.—Esdras.
E. S. E.—East-south-east.
Esq.—Esquire.
Esth.—Esther.
Et al.—Et alii (and others).
Etc. or &c.—Et cæteri, et cæteræ, et cætera (and others; and so forth).
Et seq.—Et sequentia (and what follows).
Ex.—Example; Exodus; executor.
Exc.—Excellency; exception.
Exec. Com.—Executive committee.
Execx.—Executrix.
Exch.—Exchequer or exchange.
Ex. g. or Ex. gr.—Exempli gratiâ (as for example).
Exon. D.—Exeter Domesday-Book.
Exor.—Executor.
Exr. or Exec.—Executor.
Ex S. C.—Ex senatûs consulto.
Ex V.—Ex voto.
Ez.—Ezra.
Ezek.—Ezekiel.
F.—Franc.
Fahr.—Fahrenheit.
F. A. M.—Free and Accepted Masons.
Far.—Farthing.
F. A. S.—Fellow of the Antiquarian Society.
Fcap. or fcp.—Foolscap.
F. D.—Fidei Defensor or Defensatrix (defender of the faith).
Fe.—Ferrum (iron).
Feb.—February.
Fec.—Fecit (he did it).
Fem.—Feminine.
Fi. B.—Fide bonâ.
Fid.—Fides.
Fi. fa.—Fieri facias (cause it to be done).
Fid. Def.—Defender of the faith.
Fig.—Figure.
Fir.—Firkin.
Fla.—Florida.
F. L. S.—Fellow of the Linnæan Society.
F. O. B.—Free on board.
Fol.—Folio.

For.—Foreign.
F. P. S.—Fellow of the Philological Society.
Fr.—Franc; francs; free; fragmentum (fragment); Francis.
F. R. A. S.—Fellow of the Royal Astronomical Society.
Fred. or Fredk.—Frederick.
F. R. G. S.—Fellow of the Royal Geographical Society.
Fri.—Friday.
F. R. S.—Fraternitatis Regiæ Socius (Fellow of the Royal Society).
F. S. A.—Fellow of the Society of Arts.
Ft.—Foot; feet; fort.
Fur.—Furlong.
F. Z. S.—Fellow of the Zoological Society.
G.—Guineas.
G. A.—General Assembly.
Ga.—Georgia.
Gal.—Galatians; gallon.
G. A. R.—Grand Army of the Republic.
G. B.—Great Britain.
G. C.—Grand Chapter.
Geog.—Geography.
Geol.—Geology.
Geom.—Geometry.
Ger.—Germany; German.
G. L.—Grand Lodge.
G. M.—Grand Master.
G. O.—General order.
Goth.—Gothic.
Gov.—Governor.
G. C. B.—Grand Cross of the Bath.
G. C. H.—Grand Cross of Hanover.
G. C. L. H.—Grand Cross of the Legion of Honor.
G. E.—Grand encampment.
Gen.—Genesis; general.
Gent.—Gentleman.
Geo.—George.
Gov. Gen.—Governor-general.
G. R.—Georgius Rex (George the King).
Gr.—Greek; gross.
Gram.—Grammar.
Gro.—Gross.
Grot.—Grotius.
Gtt.—Drops.
H. a.—Hoc anno (this year).
Hab.—Habakkuk.
Hab. corp.—Habeas corpus (you may have the body).
Hag.—Haggai.
H. B. C.—Hudson's Bay Company.
H. B. M.—His or Her Britannic Majesty.
H. C.—House of Commons.
Hdkf.—Handkerchief.
H. e.—Hoc est (that is, or this is).
Heb.—Hebrews.
Hel.—Helvetia.
Her.—Heraldry.
Hf. bd.—Half bound.
Hg.—Hydrargyrum (mercury).
Hhd.—Hogshead.
Hier.—Hierusalem (Jerusalem).
Hist.—History.
H. J. S.—Hic jacet sepultus (here lies buried).
H. L.—House of Lords.
H. M.—His or Her Majesty.
H. M. P.—Hoc monumentum posuit (erected this monument).
H. M. S.—His or Her Majesty's Ship.
Hon. or Honble.—Honorable.
Hort.—Horticulture.
Hos.—Hosea.
H. R.—House of Representatives.
H. R. E.—Holy Roman Emperor.
H. R. H.—His or Her Royal Highness.
H. R. I. P.—Hic requiescat in pace (here rests in peace.)
H. S.—Sestertius (two-pence); hic situs (here lies).
H. S. H.—His Serene Highness.
Hund.—Hundred.
Ia.—Iowa.
Ib. or Ibid.—Ibidem (in the same place).
Ich.—Ichthyology.
Ictus.—Juris consultus.
Id.—Idem (the same); Idaho.
I. e.—Id est (that is).
I. H. S.—Jesus Hominum Salvator (Jesus the Saviour of Men).
Ij.—Two (medicine).
Ill.—Illinois.
Imp.—Imperator; emperor.
In.—Inch; inches.
Incog.—Incognito (unknown).
Incor.—Incorporated.
Ind.—Indiana; index; independent.
Ind. Ter.—Indian Territory.
Indef.—Indefinite.
Inf.—Infra (beneath or below); infinite.
In f.—In fine (at the end of the title, law or paragraph quoted).
In loc.—In loco (in the place; on the passage).
I. N. R. I.—Jesus Nazarenus, Rex Judæorum (Jesus of Nazareth, King of the Jews).
Inst.—Instant, of this month; institute or institutes.
Int.—Interest.
Interj.—Interjection.
In trans.—In transitu (on the passage).
Introd.—Introduction.
I. O. O. F.—Independent Order of Odd-Fellows.
I. O. U.—I owe you.
Isa.—Isaiah.
Isl.—Island.
Ital.—Italic; Italian.
J.—Justice or judge; JJ., justices; one (medicine).
J. A.—Judge-advocate.
Jac.—Jacobus (Latin for James).
Jan.—January.
Jas.—James.
J. C.—Juris consultus; Julius Cæsar.
J. C. D.—Juris Civilis Doctor (Doctor of Civil Law).
Jer.—Jeremiah.
Jno.—John.
Jona.—Jonathan.
Jos.—Joseph.
Josh.—Joshua.
J. P.—Justice of the peace.
J. Prob.—Judge of probate.
J. R.—Jacobus Rex (King James).
Jr. or Jun.—Junior.
Jud.—Judith.
Judg.—Judges.
Judge Adv.—Judge-advocate.
Jul.—Julius; July.
Jul. Per.—Julian period.
Jun.—Junius; junior.
Jus. P.—Justice of the peace.
Just.—Justinian.
J. V. D.—Juris utriusque Doctor (Doctor of Canon and Civil Law).
K.—King.
Kan.—Kansas.
K. B.—Knight of the Bath; King's Bench.
K. C.—King's counsel.
K. C. B.—Knight Commander of the Bath.
K. G.—Knight of the Garter.
K. G. C.—Knight of the Grand Cross.
K. G. C. B.—Knight of the Grand Cross of the Bath.
K. G. F.—Knight of the Golden Fleece, of Spain, or of Austria.
K. G. V.—Knight of Gustavus Vasa, of Sweden.
Ki.—Kings.
Kingd.—Kingdom.
K. L. H.—Knight of the Legion of Honor.
Knick.—Knickerbocker.
Knt. or Kt.—Knight.
K. Mess.—King's messenger.
K. S. G.—Knight of St. George of Russia.
K. T.—Knight of the Thistle; Knight Templar.
Ky.—Kentucky.
L.—Fifty or fiftieth; liber (book); Lucius.
La.—Louisiana.
Lam.—Lamentations.
Lat.—Latitude; Latin.
L. C.—Lord Chancellor; Lord Chamberlain; Lower Canada.
L. c.—Lower case.
L. C. J.—Lord Chief-Justice.
L. D.—Lady-Day.
Ld.—Lord.
Ldp.—Lordship.
Leg.—Legatus; lieutenant-general; legate; legion.
Legis.—Legislature.
Lev.—Leviticus.
Lex.—Lexicon.
L. I.—Long Island.
Lib.—Liber (book).
Lib. or lb.—Libra or libræ (pound or pounds in weight).
Lieut.—Lieutenant.
Lieut. Col.—Lieutenant-colonel.
Lieut. Gen.—Lieutenant-general.
Lieut. Gov.—Lieutenant-governor.
Linn.—Linnæan.
Lit.—Literally; literature.
Liv.—Livre (book); Liverpool.
LL. B.—Legum Baccalaureus (Bachelor of Laws).
LL. D.—Legum Doctor (Doctor of Laws).
Loc. cit.—Loco citato (in the place cited).
Lon.—Longitude.
Lp.—Lordship.
L. S.—Loco Sigilli (place of the seal).
L. s. d.—Pounds, shillings and pence.
Lt.—Lieutenant.
LXX.—The Septuagint (version of the Old Testament).
M.—Meridies (noon); manipulus (a handful); Marcus; monsieur.
M. A.—Master of Arts.
Macc.—Maccabees.
Mad.—Madam.
Mad. Univ.—Madison University.
Maj.—Major.
Maj. Gen.—Major-general.
Mal.—Malachi.
Man.—Manasses.
Mar.—March.
March.—Marchioness.
Marg.—Margin.
Marg. Tran.—Marginal translation.
Marq.—Marquis.
Masc.—Masculine.
Mass.—Massachusetts.
Math.—Mathematics; mathematician.
Matt.—Matthew.
Max.—Maxim.
M. B.—Medicinæ Baccalaureus (Bachelor in Medicine); Musicæ Baccalaureus (Bachelor of Music).
M. B. F. et H.—Great Britain, France and Ireland.
M. C.—Member of Congress.
Mch.—March.
M. D.—Medicinæ Doctor (Doctor of Medicine).
Md.—Maryland.
Mdlle.—Mademoiselle.
M. E.—Methodist Episcopal; military or mechanical engineer.
Me.—Maine.
Med.—Medicine.
Mem.—Memorandum; memento (remember).
Mens.—Mensis (month).
Merc.—Mercury.
Messrs. or MM.—Messieurs (gentlemen).
Met.—Metaphysics.
Metal.—Metallurgy.
Meteor.—Meteorology.
Meth.—Methodist.
Mex.—Mexico or Mexican.
M. Goth.—Mœso-Gothic.
M. H. S.—Massachusetts Historical Society.
Mic.—Micah.
Mich.—Michigan.
Mil.—Military; miles (a soldier); mille (a thousand).
Min.—Mineralogy; minute.
Minn.—Minnesota.
Min. Plen.—Minister plenipotentiary.
Miss.—Mississippi.
M. L. A.—Mercantile Library Association.
MM.—Their majesties; two thousand.
Mme.—Madame.
Mo.—Missouri; month; the fold of a sheet.
Mod.—Modern.
Mon.—Monday.
Mons.—Monsieur (sir).
Mont.—Montana.
Mos.—Months.
M. P.—Member of parliament; member of police; metropolitan police.
M. P. P.—Member of Provincial Parliament.
M. R.—Master of the Rolls.
Mr.—Mister.
M. R. A. S.—Member of the Royal Asiatic Society; Member of the Royal Academy of Science.
M. R. G. S.—Member of the Royal Geographical Society.
Mrs.—Mistress.
MS.—Manuscript.
M. S.—Memoriæ Sacrum (sacred to the memory); Master of the Sciences.
MSS.—Manuscripts.
Mt.—Mount or mountain.
M. T. C. or M. Tul. Cic.—Marcus Tullius Cicero.
Mus. B.—Bachelor of Music.
Mus. D.—Doctor of Music.
M. W.—Most worthy; most worshipful.
Myth.—Mythology.
N.—North; number; note; noun; neuter.
N. A.—North America.
Nah.—Nahum.
Nat.—Natural.
Nat. Hist.—Natural history.
Nath.—Nathan; Nathaniel or Nathanael.
N. B.—New Brunswick; North British or North Britain; nota bene (mark well; take notice).
N. C.—North Carolina.
N. Dak.—North Dakota.
N. E.—New England; north-east.
Neb.—Nebraska.
Neh.—Nehemiah.
Nem. con. or nem. diss.—Nemine contradicente or nemine dissentiente (no one opposing; unanimously).
Nep.—Nepos.
Neut.—Neuter (gender).
Nev.—Nevada.
New M.—New Mexico.
New Test. or N. T.—New Testament.
N. F.—Newfoundland.
N. G.—New Granada; Noble Grand.
N. H.—New Hampshire; New Haven.
Ni. pri.—Nisi prius.
N. J.—New Jersey.
N. l.—Non liquet (it appears not).
N. L.—North latitude.
N. lat.—North latitude.
N. M.—New Mexico.
N. N. E.—North-north-east.

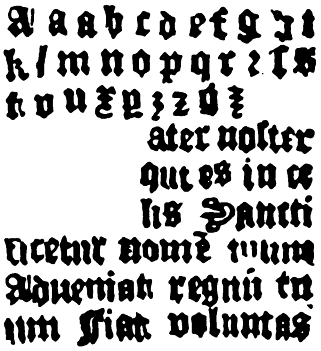
N. O.—New Orleans.
No.—Numero (number).
Nol. pros.—Nolle prosequi (unwilling to proceed).
Nom.—Nominative.
Non con.—Not content; dissenting (House of Lords).
Non cul.—Non culpabilis (not guilty).
Non obst.—Non obstante (notwithstanding).
Non pros.—Non prosequitur (he does not prosecute).
Non seq.—Non sequitur (it does not follow).
Norm. Fr.—Norman French.
Nos.—Numbers.
Nov.—November.
N. P.—Notary public.
Nr.—Noster (our; our own).
N. S.—New Style (after 1752); Nova Scotia.
N. T.—New Testament.
Num.—Numbers; numeral.
N. V. M.—Nativity of the Virgin Mary.
N. W.—North-west.
N. Y.—New York.
N. Y. H. S.—New York Historical Society.
N. Z.—New Zealand.
O.—Ohio.
Ob.—Obiit (he or she died); obolus (three half-pence).
Obad.—Obadiah.
Obs.—Obsolete; observatory; observation.
Obt. or obdt.—Obedient.
Oct.—October.
O. F.—Odd-Fellow or Odd-Fellows.
Okl.—Oklahoma.
Old Test. or O. T.—Old Testament.
Olym.—Olympiad.
Opt.—Optics.
Or.—Oregon.
Orig.—Originally; origin.
Ornith.—Ornithology.
O. S.—Old Style (before 1752).
Oxf.—Oxford.
Oxon.—Oxonia; Oxonii; Oxford.
Oz.—Ounce.
P.—Pondere (by weight); page; part; participle; publius; pugil (what may be taken up, in compounding medicine, between the two fingers and thumb).
Pa. or Penn.—Pennsylvania.
Pag.—Pagina (a page of a book).
Pal.—Palæontology.
Par.—Paragraph.
Par. Pas.—Parallel passage.
Parl.—Parliament.
Pathol.—Pathology.
Payt.—Payment.
P. B.—Philosophiæ Baccalaureus (Bachelor of Philosophy).
Pb.—Plumbum (lead).
P. C.—Privy council; privy councillor; patres conscripti (conscript fathers; senators).
P. D.—Philosophiæ Doctor (Doctor of Philosophy).
Pd.—Paid.
P. E.—Protestant Episcopal; presiding elder.
P. E. I.—Prince Edward Island.
Penn.—Pennsylvania.
Pent.—Pentecost.
Per an.—Per annum (by the year).
Per cent.—Per centum (by the hundred).
Peri.—Perigee.
Pet.—Peter.
P. G.—Past Grand.
Phar.—Pharmacy.
Ph. B.—Philosophiæ Baccalaureus (Bachelor of Philosophy).
Ph. D.—Philosophiæ Doctor (Doctor of Philosophy).
Phil.—Philip; Philippians; philosophy; Philemon.
Phila. or Phil.—Philadelphia.
Phil. Trans.—Philosophical transactions.
Philom.—Philomathes (a lover of learning).
Philomath.—Philomathematicus (a lover of the mathematics).
Phren.—Phrenology.
P. H. S.—Pennsylvania Historical Society.
Pinx.—Pinxit (he [or she] painted it).
Pl. or Plur.—Plural.
Plff.—Plaintiff.
P. M.—Post meridiem (afternoon; evening); postmaster; passed midshipman; post mortem.
P. M. G.—Postmaster-general.
P. O.—Post-office.
Poet.—Poetical.
Pon. M.—Pontifex Maximus.
Pop.—Population.
Port.—Portugal or Portuguese.
P. P.—Pater Patriæ (the father of his country); past participle.
Pp.—Pages.
P. P. C. (Fr.).—Pour prendre congé (to take leave).
P. R.—Populus Romanus (the Roman people).
Pr.—By.
P. R. A.—President of the Royal Academy.
P. R. C.—Post Romanum conditum (from the building of Rome).
Pref.—Preface.
Prep.—Preposition.
Pres.—President.
Prin.—Principally.
Prob.—Problem.
Prof.—Professor.
Pron.—Pronoun; pronunciation.
Prop.—Proposition.
Prot.—Protestant.
Pro tem.—Pro tempore (for the time being).
Prov.—Proverbs; provost.
Prox.—Proximo (next, or next month).
P. R. S.—President of the Royal Society.
P. S.—Postscript (after written); privy seal.
Ps.—Psalm or Psalms.
P. T.—Post-town.
Pt.—Part; pint; payment; point; port.
Pub.—Publicus; publisher; publication; published; public.
Pub. Doc.—Public documents.
P. V.—Post-village.
Pwt.—Pennyweight; pennyweights.
Pxt.—Pinxit (he [or she] painted it).
Q.—Queen; question; quire; query; quintus; quadrans (a farthing); quasi (as it were; almost); quære (inquire).
Q. B.—Queen's Bench.
Q. C.—Queen's College and queen's counsel.
Q. E.—Quod est (which is).
Q. E. D.—Quod erat demonstrandum (which was the thing to be demonstrated).
Q. M.—Quartermaster.
Qm.—Quomodo (how, by what means).
Q. M. G.—Quartermaster-general.
Qr.—Quarter.
Q. S.—Quarter sessions.
Qt.—Quart.
Qu.—Quære (inquire); query.
Quar.—Quarterly.
Ques.—Question.
Q. v.—Quod vide (which see); quantum vis (as much as you will).
Q. s.—Quantum sufficit (a sufficient quantity).
Quæs.—Quæstor.
Qy.—Query.
R.—Recipe (take); regina (queen); rex (king); river; rood; rod.
R. A.—Royal Academy; Royal Academician; Royal Arch; Royal Artillery.
R. C.—Rescriptum (a counterpart); Roman Catholic.
R. E.—Royal Engineers.
Rec.—Recipe or recorder.
Recd.—Received.
Rec. Sec.—Recording secretary.
Rect.—Rector; receipt.
Ref.—Reference; reformed.
Ref. Ch.—Reformed Church.
Reg.—Register; regular.
Reg. Prof.—Regius Professor.
Regr.—Registrar.
Regt.—Regiment.
Rel.—Religion.
Rep.—Representative or reporter.
Resp.—Respublica (republic).
Rev.—Reverend; Revelations (book of); review; revenue; revise.
Rhet.—Rhetoric.
R. I.—Rhode Island.
Richd.—Richard.
R. M.—Royal Marines; royal mail; resident magistrate.
R. M. S.—Royal mail steamer.
R. N.—Royal Navy.
Ro.—Right-hand page.
Robt.—Robert.
Rom.—Romans (book of).
Rom. Cath.—Roman Catholic.
R. P.—Regius Professor (the King's Professor); respublica (republic).
R. R.—Railroad.
R. S.—Recording secretary.
R. S. A.—Royal Society of Antiquaries; Royal Scottish Academy.
R. S. D.—Royal Society of Dublin.
R. S. E.—Royal Society of Edinburgh.
R. S. L.—Royal Society of London.
R. S. S., commonly F. R. S.—Regiæ Societatus Socius (Fellow of the Royal Society).
R. S. V. P. (Fr.).—Répondez, s'il vous plait (answer, if you please).
Rt. Hon.—Right honorable.
Rt. Rev.—Right reverend.
R. V.—Revised Version [of the Bible].
Rt. Wpful.—Right worshipful.
R. W.—Right worthy.
S.—South; saint; scribe; sulphur; Sunday; sun; series; sacrum; sepulcrum; senatus; solidus (a shilling).
S. A.—South America; South Africa; South Australia; secundum artem (according to art); without year; Salvation Army.
Sam.—Samuel.
Sansk.—Sanskrit.
S. A. S.—Societatis Antiquariorum Socius (Fellow of the Society of Antiquarians).
Sat.—Saturday.
Sax.—Saxon.
Sax. Chron.—Saxon Chronicle.
S. C.—Senatûs consultum (a decree of the senate); South Carolina.
Sc.—Sculpsit (he [or she] engraved it); scilicet (namely).
Scan. Mag.—Scandalum magnatum (great scandal).
S. caps.—Small capitals.
Schol.—Scholium (a note).
Schr.—Schooner.
Sci. fa.—Scire facias.
Scil.—Scilicet (to wit).
Scip.—Scipio.
S. D.—Salutem dicit (sends health).
Sculp.—Sculpsit (he [or she] engraved it).
S. Dak.—South Dakota.
S. E.—South-east.
Sec.—Secretary; second.
Sec. leg.—Secundum legem (according to law).
Sec. Leg.—Secretary of legation.
Sec. reg.—Secundum regulam (according to rule).
Sect.—Section.
Sen.—Senate; senator; senior.
Sept.—September; Septuagint.
Seq.—Sequentia (following); sequitur (it follows).
Ser.—Series.
Serg.—Sergeant.
Serg. Maj.—Sergeant-major.
Servt.—Servant.
S. G.—South Georgia; solicitor-general.
Shak.—Shakespeare.
S. H. S.—Societatis Historiæ Socius (Fellow of the Historical Society).
Sing.—Singular.
S. Isl.—Sandwich Islands.
S. J.—Society of Jesus (the Jesuits).
S. J. C.—Supreme judicial court.
S. L.—South latitude; solicitor-at-law (in Scotland).
S. M.—State militia; short metre; sergeant-major; Sons of Malta.
S. M. Lond. Soc. Cor.—Societatis Medicæ Londinensis Socius Cor. (Corresponding Member of the London Medical Society).
S. N.—Secundum naturam (according to nature).
Soc. Isl.—Society Islands.
S. of Sol.—Song of Solomon.
Sol.—Solomon; solution.
Sol. Gen.—Solicitor-general.
S. P.—Sine prole (without issue).
S. P. A. S.—Societatis Philosophicæ Americanæ Socius (Member of the American Philosophical Society).
S. P. D.—Salutem plurimam dicit (he wishes much health).
S. P. G.—Society for the Propagation of the Gospel.
Sp. gr.—Specific gravity.
S. P. Q. R.—Senatus Populusque Romanus (the senate and people of Rome).
Sq. ft.—Square foot or square feet.
Sq. in.—Square inch or inches.
Sq. m.—Square mile or miles.
Sq. r.—Square rood or roods.
Sq. yd.—Square yard.
Sr.—Sir; senior.
S. R. I.—Sacrum Romanum Imperium (Holy Roman Empire).
S. R. S.—Societatis Regiæ Socius (Fellow of the Royal Society).
S. S.—Sunday-school.
SS.—Saints; scilicet (to wit).
S. S. E.—South-south-east.
S. S. W.—South-south-west.
St.—Saint; street; strait.
Stat.—Statute.
S. T. D.—Sacræ Theologiæ Doctor (Doctor of Divinity).
Ster. or Stg.—Sterling.
S. T. P.—Sacræ Theologiæ Professor (Professor of Divinity).
Subj.—Subjunctive.
Subst.—Substantive.
Sun. or Sund.—Sunday.
Sup.—Supplement; superfine
Supt.—Superintendent.
Surg.—Surgeon; surgery.
Surg. Gen.—Surgeon-general.
Surv.—Surveyor.
Surv. Gen.—Surveyor-general.
Sus.—Susannah.

Sus. per Coll.—Hung by the neck.
S. V.—Sub verbo (under the word or title).
S. W.—South-west.
Syn.—Synonym; synonymous.
T.—Territory; Titus; tutti (all together); tome (volume).
Ta.—Tantalum (Columbium).
Tab.—Tabularius.
T. E.—Topographical engineer.
Tenn.—Tennessee.
Ter.—Territory.
Tex.—Texas.
Text. Rec.—Textus receptus (the received text).
Th. or Thurs.—Thursday.
Theo.—Theodore.
Theol.—Theology; theological.
Theoph.—Theophilus.
Thess.—Thessalonians.
Thos.—Thomas.
Tim.—Timothy.
Tit.—Titus.
Tob.—Tobit.
Tom.—Volume.
Topog.—Topography; topographical.
Tr.—Transpose; trustee; trs., trustees; trillo (a shake).
Trans.—Translator; translation; transactions.
Tr. Br. Mus.—Trustee of the British Museum.
Treas.—Treasurer.
Trin.—Trinity.
Tues. or Tu.—Tuesday.
Typ.—Typographer.
U. C.—Upper Canada; urbe condita (year of Rome).
U. E. I. C.—United East India Company.
U. J. D.—Utriusque Juris Doctor (Doctor of both Laws).
U. G. R. R.—Underground Railway.
U. K.—United Kingdom.
Ult.—Ultimo (last; of the last month).
Unit.—Unitarian.
Univ.—University; Universalist.
U. S.—United States; ut supra or uti supra (as above).
U. S. A.—United States Army; United States of America.
U. S. M.—United States Mail; United States Marines.
U. S. M. A.—United States Military Academy.
U. S. N.—United States Navy.
U. S. N. A.—United States Naval Academy.
U. S. S.—United States Senate.
Ut.—Utah.
V.—Violin; VV., violins.
V. or vid.—Vide (see).
V. or vs.—Versus (against); versiculo (in such a verse).
Va.—Virginia.
Vat.—Vatican.
V. C.—Vice-Chancellor; vir clarissimus (a celebrated man).
Ven.—Venerable.
Ver.—Verse.
V. G.—Vicar-general.
V. g.—Verbi gratiæ (as for example).
Vic.—Victores; victor; Victoria.
Vice-Pres. or V. P.—Vice-president.
Visc.—Viscount.
Viz.—Videlicet (to wit; namely; that is to say).
Vo.—Verso (left-hand page).
Vol.—Volume.
V. R.—Victoria Regina (Queen Victoria).
Vt.—Vermont.
Vul.—Vulgate (version).
W.—West.
Wash.—Washington.
Wed.—Wednesday.
West. Res. Coll.—Western Reserve College.
W. f.—Wrong font
Whf.—Wharf.
W. I.—West India.
Wisc.—Wisconsin.
Wisd.—Wisdom (book of).
Wk.—Week.
W. Lon.—West longitude.
W. M.—Worshipful master.
Wm.—William.
W. N. W.—West-north-west.
Wpful.—Worshipful.
W. S.—Writer to the Signet.
W. S. W.—West-south-west.
Wt.—Weight.
W. Va.—West Virginia.
Wyo.—Wyoming.
Xmas.—Christmas
Xn.—Christian.
Xfer.—Christopher.
Xtian.—Christian.
Y.—Yttrium.
Yd.—Yard.
Y. M. C. A.—Young Men's Christian Association.
Yrs.—Years; yours.
Y. W. C. A.—Young Women's Christian Association.
Zach.—Zachary.
Zech.—Zechariah.
Zeph.—Zephaniah.
Zool.—Zoology.

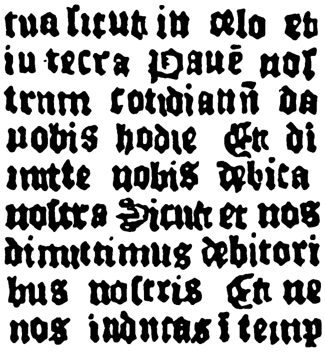
Abbrevier (Fr.).—To abbreviate.

Abbreviazioni (Ital.).—Abbreviations.

Abecedarium.—A small book used in the fifteenth and sixteenth centuries for children to learn their letters from. In the example we give the type is very irregular and unequal, although there are only nine lines to the page. This was not cut on wood, but is in separate types, as is shown in the second page, where Paue should be Pane; Cotidiaun should be cotidianu; uobis should be nobis, and uostra should be nostra. This book was discovered by Enschedé, the Dutch type-founder, in 1751, and is supposed by some Dutch antiquaries to have been printed before any other production of the printing-press. The blank in the first page is for a large P, which would begin the Pater Noster. Eight pages were printed together, of which these are the first two.


A a a b c d e f g h i
k l m n o p q r ꝛ ſ s
t v u x y ʒ z d ꝫ
ater noſter
qui es in ce
lis Sancti
ficetur nomē tuum
Adueniat regnū tu
um Fiat voluntas

FIRST PAGE OF THE ENSCHEDÉ ABECEDARIUM.


tua ſicut in celo et
iu terra Pauē noſ
trum cotidiaun̄ da
uobis hodie Et di
mitte nobis debita
uoſtra Sicut et nos
dimittimus debitori
bus noſtris Et ne
nos inducas i temp

SECOND PAGE OF THE ENSCHEDÉ ABECEDARIUM.

Abell, Arunah Shepherdson, proprietor of the Baltimore Sun, died in that city April 19, 1888, aged eighty-one. He was born on August 10, 1806, served his time in the office of the Providence Patriot, and afterwards became the foreman of one of the largest Boston offices. In 1836 he removed to New York, and shortly after, with two other compositors, went to Philadelphia and founded the Ledger. Next year he established the Baltimore Sun, of which he was continuously the publisher and director up to the time of his death. He was associated with S. F. B. Morse in the promotion of the electric telegraph, and in his paper was published the first dispatch sent over the wires, between Baltimore and Washington. Abell also demonstrated the capacity of the electric system by transmitting through it for publication the first Presidential Message ever received in that way. This was on May 11, 1848.

A. S. ABELL.

Abgang, der (of paper) (Ger.).—Waste paper.

Abgesetzt (Ger.)—Sold or disposed of (books).

Abhandlungen (Ger.).—Transactions of a society.

Abklatsch (Ger.).—A page-proof made with a brush.

Abklatschen (Ger.).—To take proof with a brush.

Abkürzung (Ger.). — Abridgment; abbreviation; epitome.

Ablegen (Ger.).—To distribute.

Ablegespan (Ger.).—The part taken up by the fingers at once in distributing.

Ablösen das Format (Ger.).—To unlock the form.

Abnehmer (Ger.).—Buyer; purchaser; subscriber.

Abonnement (Fr. and Ger.).—Subscription.

Abonner (Fr.), **Abonniren** (Ger.).—To subscribe.

Abridgment.—An epitome or abstract of a work of some size.

Absass, der (Ger.).—The paragraph; the verse.

Abschlagen das Format (Ger.).—To unlock a form; to take away the furniture.

Abschnitt (Ger.).—Section; part; chapter; division.

Abschnittlinie (Ger.).—The cut-off mark in composition.

Absetzen (Ger.).—1. To finish a take of copy. 2. A bookseller's expression, meaning "to sell." The literal translation is to "set off" or "put off."

Absies.—Books which teach the letters; an abecedarium. The name is a shortened pronunciation of A B C's.

Abstract.—A condensation by leaving out the immaterial part of a work. But the term is also applied to works which are a summary of knowledge upon a particular subject.

Abtheilen (Ger.).—To divide.

Abziehbogen beim Wiederdruck (Ger.).—The set-off sheet.

Abziehen einer Korrektur (Ger.).—To take a proof.

Abzug, der (Ger.).—The proof.

Accavallate (Ital.).—The slipping by of a letter at the end of a line, occasioned by bad locking up.

Accents.—The marks which are put over, under or through particular letters to show a different pronunciation, etymology or use from other letters. Properly so called they do not exist in English, but in almost all other languages they are occasionally found. We place a diæresis over a vowel which might otherwise be incorporated with the preceding one, as in coöperate; but this rule is not invariable, as we never use one in coeval, and such words as co-operate are frequently spelled as just given or even as cooperate. When the word is divided before the vowel which has this mark the diæresis is not used in beginning the second line. Accents are employed in dictionaries, spelling-books and other educational works to show the long and short vowels and differences in pronunciation. In poetry an acute accent (′) indicates a stress of voice in a place where there generally is none, as in lovéd. The term accents is also applied by a printer to all letters which have some mark superadded to them, as in the French ç and the Spanish ñ. A complete regular set of the vowel accents is as follows:

Acute	á é í ó ú
Grave	à è ì ò ù
Circumflex	â ê î ô û
Diæresis	ä ë ï ö ü
Long	ā ē ī ō ū
Short	ă ĕ ĭ ŏ ŭ

In some American and English books of the early part of the century it should be noted that the German diæresis, which indicates the omission of the letter e, is represented sometimes by two straight marks above the vowel, as in a̎. Occasionally it is as in uͤ. Besides the Spanish ñ and the French ç, there are the Welsh ŷ and ŵ. Accents can be made by filing away the shoulder of a letter and putting directly above or below it that part of another letter which resembles the accent. For new ones, which are sometimes necessary, type-founders charge from $3 to $5. We give herewith a complete set of the accents as used in the Century Dictionary:

àáâäāăạạ̈ạ̄âãèéêëēĕẹẹ̈ẹ̄ëìíîïīẹ̄ịòóôöōŏọọ̈ọ̈ô
úûüüūŭụụ̈ụ̄ụ̱ýỳŷÿȳy̆ṳṣṭẓṛ
áàâäāăâãéèêëēĕêíìîïīóòôöōŏõúùûüūŭýỳŷÿȳy̆çñ
ÁÀÂÄĀĂÉÈËÊĒĔÍÌÎÏĪĬÓÒÔŌÖŎÚÙÛÜŪŬÑÇ

The following are the accents in the principal foreign languages:

Bohemian	č ď ě ň ř š ť ž ý ů
German	ä ö ü
French	à â é è ê ë î ï ô ù û ü
Danish and Norwegian . .	Ø ø
Dutch	ÿ ẅ
Italian	à è ì ò ù
Polish	ą ę ć ł ń ó ś ź ż
Portuguese	á é í ó ú ã õ
Roumanian	ă ĕ ĭ ŏ ŭ ş ţ ḑ
Swedish	Å å
Spanish	á é í ó ú ñ

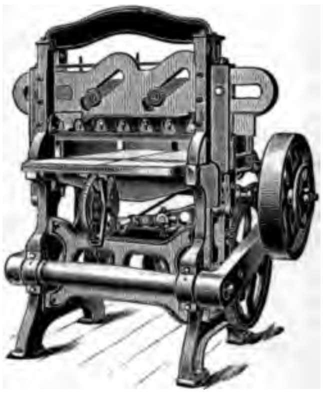
In many Oriental tongues accents are the rule; they are very peculiar and must be studied in their respective grammars. They are justified in, both above and below, but are frequently cast on the body, the letter being kerned. In Greek the accents are very numerous.

Accents and signs for display type or for unusual faces of any kind should always be charged for. For job type of large size accents are provided by the type-founders separate from the letters, over which they are justified. See FLOATING ACCENTS.

Accidents.—Southward lays down several good rules upon this subject. The oiling up of those moving parts of a machine that may do injury to the person supplying the lubricant should never be done while the machine is in motion. If it is necessary to get within the frame of the machine the belt should be thrown off the countershaft pulley before this getting in is attempted. The machine ought to be absolutely incapable of being put in motion by accident. Most painful mutilations occur in offices through neglect of this simple precaution. No workman ought to be expected or allowed to risk life or limb when it is utterly unnecessary to do so. Machines that threaten danger to workmen ought not to be employed when safer ones can be found. Some forms of card and job presses, such as the Alligator press of thirty years ago, constantly inflict injuries.

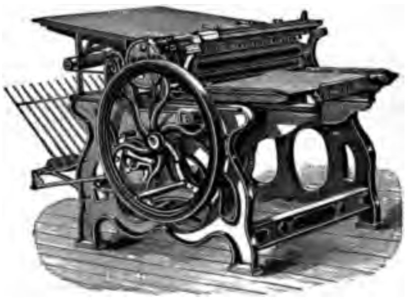
Accidenzen.—In German, jobs, literally accidents. A compositor on job-work is an Accidenzsetzer, and the work on jobs is known as Accidenzarbeiten.

Acme Cutting-Machine.—A paper-cutter which in the larger sizes has great power, clamping the paper without the use of special machinery. Great accuracy can be obtained by its use. There are many sizes.



ACME PAPER-CUTTER.

Acme Press.—A press manufactured in Boston, which was invented by C. W. S. Montague. It is moved by hand-power, and is designed for country papers. The cylinder is a very small one, and the press is very short. The feed-board and the fly are both at the same end of the press.



ACME PRESS.

Accolade (Fr.).—A brace.

Account-Books.—See BLANK-BOOKS.

Accounts.—See BOOKKEEPING.

Account-Line.—Compositors who work in companionships generally charge for so many pages at each weekly or bi-weekly day of payment. This may be, and very often is, more than has been made up and corrected. Those who thus charge on account are in England said to have an account-line.

Account-Mark.—A sign used in commercial books and on price-currents to denote "account current." It is thus made : ℀.

Acheyer l'Impression (Fr.).—To finish printing.

Acheyer une Feuille (Fr.).—To finish a sheet.

Acrostic.—A poem so arranged that the first letters in each line, read in connection with each other, form a word or words. The verse sent into a printing-office ought always to be read to see whether something of this sort has not been attempted, as newspapers and magazines of the greatest circulation have frequently fallen victims to those who have here placed the vilest and most obscene expressions. Occasionally the last letters make an acrostic. In Italian an acrostic is printed with the letters turned on their sides, as follows :

G rande nel suo proposito,
A rdito e fiero in guerra,
R itorno dall'America
I n questa nostra terra,
B ollente di distruggere
A ustria e tiranni re,
L ibera facendo Italia
D all'Alpi al Sicul piè . . .
I ndovinate chi è?

Acta Diurna.—A daily newspaper published in Rome at the period of its greatest power. It was really a bulletin affixed to some public building to which those might go who were interested in matters of state, but it also included many things relating to private persons and remarkable occurrences. Copies of this were made for wealthy Romans in the city and for those who were away on public business or who were residents elsewhere. Under the consulship of Julius Cæsar the government made provision for the publishing of all the acts and state occurrences of the day. Those who gathered the news were called actuarii. Petronius has preserved a few of the paragraphs contained in them, which read singularly like those in the newspapers of the present time :

"On the 26th of July twenty boys and forty girls were born at Trimalchis's estate at Cumæ. At the same time a slave was put to death for uttering disrespectful words against his lord. The same day, a fire broke out in Pompey's gardens, which began in the night, in the steward's apartments."

The Romans had a great love of scandal, and reports of trials for divorces were particularly sought after. Earthquakes, miraculous portents and singular accidents were all inserted. False news, to manipulate the markets, was sometimes given to the reporters. The proceedings of the courts of law, accounts of the progress of the public buildings, news from the armies, and births, deaths and marriages made up most of the journal.

Actinic.—A name applied to photo-engraving, as the process depends upon the actinic or solar rays, which act upon the sensitive material. See PROCESS PRINTING.

Acute Accent.—A mark over a letter thus : á.

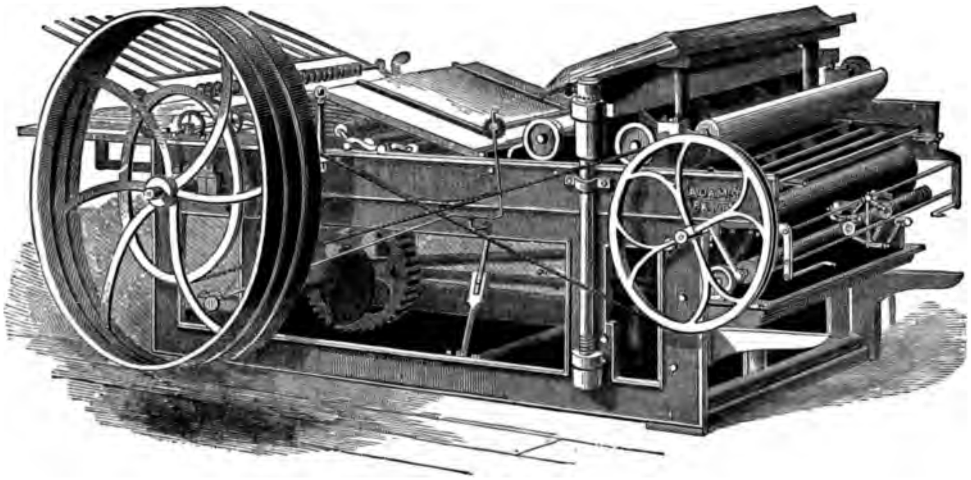
Ad.—A colloquial abbreviation for advertisement. It forms its plural as ads.

Adams, Isaac, the inventor of the Adams press, was born in Rochester, N. H., in 1803. He was first an operative in a factory, and then a cabinet-maker. In 1824 he entered a machine-shop in Boston. He was employed in 1827 by Daniel Fanshaw, a well-known printer of New York, to attend to his steam-engine and make repairs to the Treadwell presses, of which Mr. Fanshaw had a number. Many of the ideas of this press were the same as those which later were familiar to us in the Adams press, and they undoubtedly suggested to the inventor many of his procedures. Mr. Adams brought out his press in 1830 and in 1834 improved it. He was a member of the Massachusetts Senate in 1840, and died at Sandwich, N. H., July 19, 1883.

Adams, Joseph Alexander, a noted engraver of New York, was the first who disclosed the possibilities of the printing-press in relation to engravings. He was born at New Germantown, N. J., in 1803, and began the printer's trade at Morristown, where he was regularly apprenticed. After reaching his majority he went to New York and was employed for some three weeks as a printer. A job coming in that required a cut he undertook to make it, and was so successful that he determined to abandon printing and turn to engraving. He speedily became the first in his line in the Union. After he was well known he entered into negotiations with Harper & Brothers for the publication of a Family Bible, to be well illustrated with engravings on wood of a class superior to anything previously attempted in America. He had already engraved many blocks in anticipation of the appearance of the work, and when the Harpers consented to take it up he made his preparations for a more careful make-ready than had before been known. A form might have been delayed on the press for an hour or two on account of defective register, but to spend half a day on a cut form was a thing then unheard of. Mr. Adams entered the pressroom with the workmen and cut overlays and suggested underlays, watching the effect of every new impression. It was days before the first sheet was ready, but the appearance of the work justified the time which was spent. Harper's Family Bible was by all odds the finest illustrated book that had up to that time been made in this country, and bears favorable comparison with most illustrated work of the present day. It was found that the distribution that could be given by two rollers was insufficient, and new presses were made by Isaac Adams, on whose presses this work was done. They contained six rollers. On this work, too, the first regular use of electrotypes was made, the blocks being ruined, however, by the wet process then in vogue. The success of the Bible with the public was great, and both the artist and the publishers received large sums from its sale. Mr. Adams continued in business till about the time of the war, when he retired. His engravings were singularly soft and delicate, but had larger masses of pure white and very many fewer lines than is now the fashion. He made several improvements in electrotyping after the Bible was finished. His death occurred about 1870.

Adams Press.—A press invented by Isaac Adams about 1830 and subsequently improved by his brother, Seth Adams. When power presswork first started in England it was cylindrical, somewhat as our cylinder presses are now. The first improvements were to construct a four-sided prism, upon which flat forms could be put, and against which inking-rollers and an impression cylinder were pushed, thus making an early rotary press. Another plan was to have stereotype plates fixed to a cylinder, so that the motion could be continuous. But a flat bed and flat platen were not immediately adapted to the needs of printers, although it is evident that the speed of the ordinary press could be very greatly increased. Treadwell, an American, invented something of this kind, which was in operation in Boston as early as 1824. But his printing-office was burned down, and it was not till 1826 or 1827 that he had new machines for sale. When Adams began with his apparatus he had the advantage of a knowledge of what Treadwell had done, and many of the best features of the latter's invention were incorporated in the new machine. There had also been at that time several successful machines in England. There is no question, however, that the Adams press excelled all its predecessors, and it remained a favorite for more than fifty years, during which many improvements were made. Even up to the present day there are many printers in neighborhoods where rent is cheap who prefer it when short runs only are needed. It went out of use partly for the reason that stereotyping was stopped. Publishers had an idea that stereotypes would be broken on cylinder presses. Electrotyping accomplished all that stereotyping could and some things that it could not, and plates thus made are very tough and will not break. There was therefore no need of keeping up two kinds of apparatus to do one kind of work, and the best drove out the worst. The cylinder press surpassed the Adams press, as its speed is more, its impression stronger at the points of contact, and its size greater. Few Adams presses were made larger than 28 by 40, while 33 by 46 or 38 by 48 are common sizes on cylinders.

The Adams press has a stationary platen and a bed that does not move backward and forward. Its only movement is up, to press against the platen, and down to its former place again. This rise and fall is a considerable one, as rollers must pass between the form and the impression surface. The sheet is fed in from above the end of the machine and is taken to the point of impression upon a frisket. The platen is secured very strongly, the power exerted against it being estimated at 40, 50 or 60 tons. When the frisket has reached its proper place the bed rises, makes the impression and falls again, the sheet then being taken to the other end of the press by tapes and deposited upon flies. Fifty-four sizes and styles were made, including two, four and six roller presses. The earlier presses had a wooden frame and were frequently driven by man-power. About 1860 the patents were purchased by R. Hoe & Co., together with the works, which were situated in Boston and were carried on by them for a long time, finally, however, being closed. It is needless to say that, however good the machines had been under their original makers, they were improved by the Hoes. Many minor alterations were made and they grew stronger and heavier. But of late the builders have not cared to push them and their manufacture will be abandoned as soon as possible, the cylinders answering so much better. Some have been sold in New York within a year or two for no more than the price of old iron, although still capable of doing good work. It is possible that they would have had a longer lease of life if competition among publishers had not developed the fact that it is better to print a 12mo as a 16mo than on its own paper. The regular size for 12mo was 28 by 41, but, by adding another row of pages, paper 30 by 41 could be worked. One-fourth of the presswork could thus be saved, and the folding and sewing would be cheaper and more expeditious. Duodecimo was a familiar size on the Adams press, and it had retained this work when larger and smaller pages had gone elsewhere. But, of course, it could not compete against such odds as it has lately been meeting with.



ADAMS PRESS.

Adams, Seth, a brother of the inventor of the so-called Adams press, and for many years in partnership with him, was born in Rochester, N. H., April 13, 1807. His first employment was as a cabinet-maker, but he was afterwards in a Boston machine-shop. In 1831 he began in this business for himself, and two years after commenced making the press his brother had invented, subsequently obtaining an exclusive right for this purpose. The firm of I. & S. Adams was formed in 1836. The varieties of the press were multiplied, improvements were put in, and a few years later they were constructed largely of iron. The business was a very profitable one and fortunes were made by it. Seth Adams was also engaged in sugar refining. He established and endowed an asylum for the treatment of nervous diseases in West Roxbury, Mass. He died at Newton, in that State, December 7, 1873. A handsome monument has since been erected to his memory at his native place.

Adams, Thomas F., a writer on printing, carried on the art in Philadelphia for a number of years. His book, entitled Typographia, was the second upon that subject issued on this side of the water, and retained for many years a position of importance as the instructor of the young printer. It was, however, very largely compiled from Hansard and Johnson, even in cases where practices were described which never existed in America. The first edition was published about 1835.

Addenda.—Something added to a book; in the singular, addendum.

Address.—A name at the foot of a print, giving the name of the publisher or printer. There is a difference in value between a "first address" and a later one, and "before any address" is still more valuable.

Address-Book.—In a composing-room, pressroom or bindery, a book with addresses of all the workmen who are or might be employed, stating the kind of work. In a newspaper office, a list of those from whom letters, reports, editorials or articles can be obtained.

Address-Cards.—Cards containing a name and address, the same as visiting-cards.

Addressing.—Writing the wrappers in a newspaper office.

Admir.—An abbreviation used in an English proof-room for a note of admiration or exclamation point.

Admiration, Note of.—A mark indicating surprise, joy or admiration, thus: !

Adolphus of Nassau, a German prince, who attacked the city of Mentz and sacked it in 1462. As a consequence many inhabitants fled, and it is probable that the early spread of the art of typography throughout Europe was largely owing to this ill-luck to the city where printing is believed to have begun.

Advertisement.—1. The notice or explanation by the publisher of the scope, method of publication, price, or other matter relating to a book, and placed in one of the first pages of the volume. This word also refers to notices by an editor or author of the same kind. It is generally set in type one or two sizes less than the body of a work, but sometimes one size larger. 2. A notice in a newspaper or magazine. See under ADVERTISING.

Advertising.—To advertise is to call attention to anything. In printing circles it means a notice in a book, magazine or newspaper, bringing to attention some particular fact or facts of benefit to the advertiser. When the whole of a periodical or a book is devoted to a single subject, although the statement may be of value to the writer or publisher, it is not an advertisement. That term is restricted to matter which does not form the main portion of the pamphlet or newspaper. The collection of advertisements forms a very essential portion of the work of a periodical, and in daily and trade papers more space is taken up with them than with reading matter. Until the census of 1880 we had no statistics on this matter, but the report of Mr. S. N. D. North for that year shows that nearly half the entire income of newspapers in the Union was derived from advertisements, the proportion of receipts from this source being in weeklies 39 per cent. and in dailies 44 per cent. The sum total paid in 1880 for advertising was $39,136,306. There are as yet no figures for 1890. Advertising in the chief papers grows more rapidly than subscriptions, but a new paper requires considerable time before its revenue from this source reaches even 25 per cent. of its expenses. Several of the larger newspapers of the Union receive each $500,000, or more, from this source yearly; three or four have $800,000, and one does not fall much short of $1,400,000. Periodicals that are well known receive ten cents a line and upward for each insertion, a number asking $1 or more, and some as much as $2.50, for preferred locations. Country weekly newspapers or purely local ones receive about $10 an inch a year, or $100 a column, but this is very much shaded in many cases. On the other hand, many receive more. Country dailies obtain from $200 to $1,000 a column a year, and charge $1 or thereabouts for the first insertion of ten or twelve lines, and fifty cents afterwards. Good trade papers ask about $40 a year for an inch. The term "square," which was once used in reference to advertising, is becoming obsolete, as it varies from four lines of agate to eighteen lines of brevier, and is consequently too indefinite to be used as a measure. Advertisements are arbitrarily classed by publishers without much regard to what other publishers do. Thus, in one New York daily wants have generally been $1.20 for an employer and forty cents for a workman, while servant girls could advertise for twenty cents. In another, wants of either kind are ten cents. Book advertisements are generally at about half rates, while financial advertisements are the highest. An advertisement does not necessarily include a copy of the periodical in which it is running, although many publishers send one as a matter of courtesy.

Advertisements in various parts of a newspaper have different names and different prices. They are known as business notices, special notices, city items, and by a dozen other names, but the usage of one newspaper is not that of another, and consequently no absolute definition can be given of them. As a general thing, those that are on a page chiefly of reading matter are worth the most. The top of a column is preferred to the middle or bottom, but it is rare that an extra charge is made for this. Position on the cover or outside page is nearly always higher than elsewhere, and sometimes twice as high. Many contracts are made "next to reading matter." In this sense reading matter is any matter that is not advertising, but it does not mean the first position on a page where there is no reading matter, but following immediately after a page filled with it. It would frequently avoid dispute if "reading matter" was construed as not including market reports or commercial matter.

Advertisements come into the printing-office marked as to space and time, as well as position, if that is desirable. The length of marked-in lines means the length in lines of the smallest type generally used, or the body type of the advertisements. In city dailies and weeklies this is nearly always agate; in country dailies and weeklies nonpareil or minion, and it is nowhere larger than brevier. Some periodicals, like the New York Herald, refuse to use anything else than Roman of the body type; others use several sizes, but most journals require display type to please their advertisers. These should never be bought in the ordinary small fonts of the type-founder, but doubled or tripled, and as effective a display for ordinary work can be obtained from Clarendons, light-faces and such permutations of Roman, with Gothics, as is necessary. They are usually begun with a two-line letter, if there is to be no great amount of display. If the advertisement is in nonpareil the two-line letter is generally two-line minion, the first line being set in brevier, so as to make the bodies justify exactly together; if the body is in agate the first letter is two-line nonpareil, the first line being in minion. Frequently, however, the two-line letter is double the letter used in the body. Little Italic is used in advertisements. Some newspapers have a rule that words must be to some extent contracted in run-in advertisements, as st. for street, av. for avenue, and the like. The fattest advertisement is generally the first take at night on a daily paper, and the compositors take turns in having it. The advertisements go all around the office, except where there are departments or where certain men have bought the right from their fellow-workmen. Small advertisements, like wants, are given out in a bunch together, four or six of them at a time. In some establishments the compositors must read each one before beginning, so as to ascertain what heading to put on, "Seamstress," "Valet," or "Housemaid." Difficulty is experienced in offices where many of these small advertisements are set because they cannot be properly classified. The clerk in the counting-room makes a rough separation, but this has to be done still further on the galleys of proof and by the make-up. Late at night the galleys should be very short, and so should be the takes. On weekly or monthly papers, with small pages and much advertising, it is a good plan to make up only two or four pages in a chase. They can be handled much easier than if they were the full size of the paper, the pages can be transposed quickly and they go on the press just as well. Two or four chases are used instead of one. That is all the difference.

It is a very strict rule in some offices that no cuts can be inserted, and in others that medical or objectionable advertisements shall not be taken. The objection to the first is that it destroys the uniformity of the paper, while the cuts, being hurriedly printed, and frequently being of very inferior quality, will present an appearance the very reverse of handsome. The objection to the second is that many are cheats, and the reader to some extent associates the publisher with them. It injures the standing of the newspaper and the value of the other advertisements.

Advertisements in the United States are not taxed and never have been, except during the Civil War and immediately afterward. This was at the rate of 3 per cent., and returned about $1,000,000 in all for the five years it was imposed, from 1863 to 1867, inclusive. In England, however, a duty was levied on advertisements for many years, beginning before the Napoleonic wars. In the early part of the century this amounted to 3s. 6d. duty on every one, whether important or unimportant. The result was that the long-established and profitable papers were rendered still more profitable; for if a sum of money must be paid for the tax, in addition to the value of the advertisement, no one would try a new and weak journal, but would rather place his favor where it would have the most readers. This duty was abolished in 1853.

The current rate of charge on standing advertisements has been, in New York, five cents per 1,000 ems a week or ten cents a month, but it is a question whether this is enough. De Vinne in his Price-List of 1871 makes the charges on standing matter at ten cents per 1,000 ems on weekly papers and fifteen cents each month on monthlies. When the edition is very large and is not stereotyped a greater price should be made. A font of type will give only 250,000 impressions on good work, and not more than twice that on anything. So that a standing advertisement in a paper of 50,000 circulation will be worn out in from five to ten weeks.

Advertising Agent.—A broker who collects advertisements and inserts them in newspapers, receiving commissions upon them from the journals. He differs from a solicitor of advertisements, who is in the employment of the newspaper and does not guarantee their payment. When an agent orders the insertion of a notice the publisher looks to him alone for the bill, and not to the person who is benefited. The commission paid on the smaller papers is usually 25 per cent. and on the larger from 10 to 20, while there are certain newspapers that pay from 30 to 40, and sometimes as high as 66⅔ is given. It is needless to say that in these cases the advertising is not worth anywhere near the price asked for it, as the publisher knows. The common basis for payment of advertising is a cent a line per thousand circulation, but this must be modified according to exigencies. There is a certain newspaper published in New York which does not issue more than three or four thousand copies per week, but asks twenty-five cents a line, with scarcely any discount on long advertisements or long time. Yet it pays to advertise in it. The three or four thousand it sends out are to the richest stock speculators, railroad managers and active capitalists in the world. He who wishes to place a great railroad scheme before the public cannot do better with his money than to put it there. Under the same category come trade papers. They ask high prices because they address just the audience that the advertiser wishes to reach. The advertising agent does not deal much with these journals, nor with any that occupy a select but limited field. He takes business for the popular papers chiefly. With them the estimate of a cent a line per thousand circulation is a fair one, weeklies being worth more than this and dailies less. The agent serves a valuable purpose. He gathers the little advertisements of the country and places them in the newspaper, which the advertisers would be unable to do at anywhere near the expense, as it would require considerable letter writing and many postage stamps. There are in the United States and Canada about eighteen thousand periodicals, and a letter sent to all of them with an inquiry would cost at least three cents apiece, without the labor of directing. That alone would be $540. The advertiser has no list of newspapers, no schedule of charges and no idea as to circulation. The agent has, and puts his knowledge at the disposal of his patrons. He serves another valuable purpose in insuring that the money thus earned will be paid. Good business managers of newspapers will not take advertisements valued at $2 or $3 from persons in distant towns whom they do not know. They do know the agents, and the agents know the residents in their own localities. It is supposed that there are about two hundred advertising agents in the United States, some doing a business of $500,000 a year. One advertising agent has done a business of $1,200,000 a year. Some agents also deal in type and ink, but the majority confine themselves to advertising proper. When the newspapers which contain their notices are received they are examined as to insertion, location and correctness, and are checked and filed away, some agencies keeping them a year, so that their customers can see them at any time. The first advertising agent in the Union was the late John Hooper, of New York, who preceded Van Buren Palmer a short time. He began in 1841, having previously been a clerk on the New York Tribune, then just started. The New York Directory of 1851 had only four names of agents, and as late as 1870 nine-tenths of the business in New York was transacted by five firms. There are at present over thirty doing a good business, besides a number of smaller ones.

Advertising Rule.—A thin line of brass, type high, used to divide one advertisement from another. In daily newspapers they vary in thickness from four to pica to agate, the shoulder being cast on them.

Advertising Solicitor.—One who gathers advertisements for a newspaper and is in its employment. He is paid by commission, salary, or both combined. Advertisements thus received should be on blank forms, filled in with writing, and with the advertiser's name signed to it. Nothing is more common than for an advertiser who has given a verbal order to deny it.

Advy.—An abbreviation for advertisements, now little heard. The plural is advies.

Æ.—A diphthong of frequent occurrence in Latin and in words derived from the Latin. Many modern editors of Latin books separate the two letters, as they do oe. For instance, ædibus, gratiæ, regiæ are frequently spelled aedibus, gratiae, regiae. Æ is expressed in German by ä.

Affiche, l' (Fr.).—A handbill, a poster.

Affissi (Ital.).—Handbills or posters.

Affix.—A syllable added to the stem of the original word, the same as suffix.

Afghanese.—The language of the natives of Afghanistan makes use of the Arabic characters as well as of a number of special ones. It is sometimes called Pushtu.

Agate.—A small size of printing-type, between pearl and nonpareil, half the size of small pica. A little over thirteen lines go to the inch. By the point system it nearly corresponds to five and a half points. Its chief use is for advertisements and market reports in daily papers, on which it is generally the smallest size used. It is also largely employed in time-tables. It was unknown before 1822, when George Bruce, who was endeavoring to have a truer relation between the bodies of type than then existed, saw the gap between pearl and nonpareil, and introduced this size to fill it. In England it is called ruby. Hansard's Typographia, published in 1825, says that a few years before it was found by him absolutely necessary to give some distinguishing appellation to this size, as the founders had given him one-nick pearls of two bodies, one of half small pica and one of half long primer. He therefore called the former ruby.

This line is set in agate.

Aggiunte (Ital.).—Words not in the copy.

Ahle, die (Ger.).—The bodkin.

Ais à Desserrer, l' (Fr.).—The letter-board.

Aitken, Jane, a printer in Philadelphia, was the daughter of Robert Aitken. After her father's death in 1802 she continued the business. In 1808 she published a translation of the Bible, executed by Charles Thomson, who was the secretary of the Continental Congress for its whole existence. The manuscript is still preserved, and is probably the oldest specimen of American copy extant. "She obtained," says Thomas, "much reputation by the productions which issued from her press."

Aitken, Robert, a printer of Philadelphia, was born at Dalkeith, Scotland, about 1734, and served an apprenticeship as a binder in Edinburgh. He went to Philadelphia as a bookseller in 1769 and became a printer in 1774. In 1775 he published a magazine of which Thomas Paine was the editor, and in 1782 an edition of the Bible in duodecimo, with brevier type. This was the first edition in English with an American title-page, and was recommended to the country by Congress as a pious and laudable undertaking. After the Revolutionary War he printed several valuable works, among others the Transactions of the American Philosophical Society. He died in July, 1802, leaving an excellent reputation.

Ajouter (Fr.).—To add.

Akkolade (Ger.)—A brace.

Alabama.—Printing was introduced into Alabama in 1812, at Huntsville. It is a sparsely-settled agricultural State, and in consequence little printing has been done there, except that of local newspapers. Mobile is the largest town. By the last report there were seventeen dailies and 158 other periodicals.

Alaska.—Printing has been done more or less in Alaska since it was acquired by the United States. The first newspaper was published in Sitka, May 1, 1868, by W. S. Dodge. Under the Russian Government no book or paper was published in that Territory, but several valuable charts were engraved and printed there.

Alauzet, Pierre, a noted press-builder in Paris, was born on June 15, 1816, at Rodez, in Southern France. He was brought up on a farm, but conceived the idea of becoming a mechanic. His first experience in this way was in a forge, where he learned to be an accomplished smith. At Marseilles he became attached to a regiment, which was shortly after sent to make a part of the garrison of Paris. He accompanied it, and ever after remained in the capital. When his engagement ended he entered the shop of a press-builder, learning the business very thoroughly, and also taking scientific lessons. In 1846 he associated himself with his father-in-law, whose name was Gillimann, and began the manufacture of machines and tools for printers. A short time after he bought some ground, upon which he put up a building. Subsequently he added other edifices, until the whole now consists of some of the largest structures in the world of their kind. He steadily paid attention to the improvement of the presses he built, introducing many new forms and new devices, as well as improving their workmanship. He died January 22, 1881.

PIERRE ALAUZET.

Albany.—This was the second place in the colony of New York in which printing was begun, the original conductors of the press being Alexander and James Robertson. They were Scotchmen and probably learned their trade in North Britain. "They were patronized by Sir William Johnson, then Superintendent of Indian Affairs, who advanced them money to buy a press and types," says Thomas. Business was begun about the year 1771 and continued until the beginning of the Revolutionary War, the printers having also for a part of that time an establishment in Norwich, Conn. They issued, after public feeling was aroused, some highly inflammatory pamphlets on the Tory side, which created much sentiment against them, and in 1775 they judged it expedient to leave the city hastily, going to Norwich. They left their press and type in the care of a friend who resided in the vicinity of Albany, who removed them privately to his farm and there buried them. In 1782 they were dug up by Solomon Balantine, who began publishing the New York Gazetteer and Northern Intelligencer, in conjunction with a partner. The Robertsons had issued a paper called the Albany Gazette. Webster began at about the time peace was established another paper of the same name, which was continued till 1845. After a few years Albany became a great centre of printing, and has since remained so. The capital there employed in this industry is very large, and several houses are still in existence that began over half a century ago. Joel Munsell, who carried on business there for a long time, was justly ranked as one of the foremost printers of the New World. Nine dailies and thirteen other periodicals are now published in Albany.

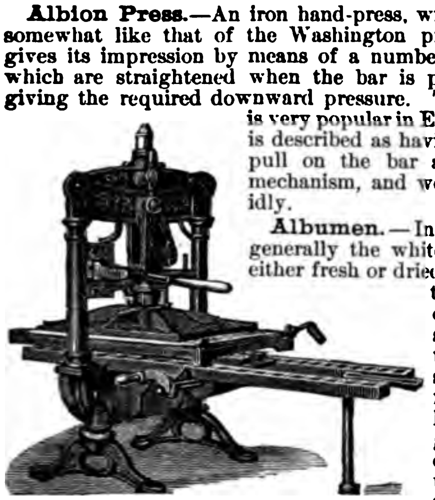
Albatype.—A system of making poster types by analyzing the letters, cutting them into squares and then composing them so that they shall come together properly. For instance, an I can be made of four blocks, two for the body and one for each of the serifs. H would require nine blocks, the two uprights, with four pieces each, and one for the crossbar. This idea is extended so as to include the circles and ovals.

Albert Envelopes.—In England, small square envelopes to take Albert note-paper in half, 4¼ by 3¼ inches.

Albert Note.—In England, a kind of writing-paper cut to 6 by 3⅞ inches.

Albertype.—This is a process of reproducing photographs on gelatine, which is printed very much like a lithograph. It was invented by Joseph Albert, of Munich, in 1869. A sheet of plate-glass is coated with a thin film of chromatized albumen and gelatine, laid face down on black velvet and exposed to light. It is then washed and dried. The insoluble film adheres firmly to the glass and serves as a foundation for the second film, which consists of chromatized gelatine. This is exposed under a negative which has been reversed by stripping. The plate is then soaked in water to remove the soluble bichromate, the film is hardened with chrome alum and then dried. The result is an almost invisible picture in gelatine, which has become insoluble in water, and actually repellant to it; while the gelatine, which was protected by the negative (the whites), retains its absorbing power. The plate is fastened by plaster-of-paris to the bed of the press, and the printing is then conducted as in the lithographic way. A wet sponge is applied to moisten the whites, and an ink-roller to ink the picture. A sheet of paper is placed on the surface, and on applying pressure the ink is transferred to it. The picture may also be printed on linen, silk, &c. See PROCESS PRINTING.

Albion Press.—An iron hand-press, with a frame somewhat like that of the Washington press, which gives its impression by means of a number of levers, which are straightened when the bar is pulled, thus giving the required downward pressure. The Albion is very popular in England. It is described as having an easy pull on the bar and simple mechanism, and working rapidly.


ALBION PRESS.

Albumen.—In binding generally the whites of eggs, either fresh or dried, but sometimes from other substances. In the fresh state that from eggs is known as glair. It is of great utility to the binder, serving as a foundation for his gold, and is used also for other purposes. Desiccated egg albumen is in the form of a powder. Three teaspoonfuls of cold water added to half a teaspoonful of powder represents the normal consistency of the material. The manufacture is carried on in the neighborhood of Moscow, at the houses of the country people. It is also largely produced in the neighborhood of Korotscha, the largest establishment there using 8,000,000 eggs in a year. Albumen is largely manufactured from blood; five oxen, or twenty sheep, or thirty-four calves are said each to produce two pounds of dry albumen. In producing blood albumen for commerce the object to be kept in view is the attainment of a substance whose solution is free from color, possesses the power of coagulation and is cheap.

Alden, Timothy, the inventor of a type setting and distributing machine which attracted much attention thirty and thirty-five years ago, belonged to an old New England family, and was born at Yarmouth, Mass., on June 14, 1819. He entered a printing-office, that of the Barre Gazette, at Barre, Mass., when only sixteen, and continued as a compositor till he was twenty-seven. He was early heard to declare that if he lived he would invent some plan by which the slow and tedious work of the typesetter could be facilitated. His work on the machine began as early as 1838, and was continued until his death, December 4, 1858. In 1846 he went to New York, where he completed his machine sufficiently to obtain patents in 1856. Those who assisted him with money kept on experimenting with the invention until some fifteen years ago, when the patents, the machines and the machinery for making them were sold at auction, bringing only a song. Half a million of money had been spent, and the stockholders declined paying out any more. The apparatus contained 14,626 parts, weighing 1,460 pounds, and would cost to manufacture in quantities $2,000 each. It was much simplified towards the end. It was tried in several places in New York, as well as in some other cities, but was generally thought by printers to be slow. To be really profitable a complex machine must regularly produce more than 3,500 ems an hour. Theoretically, this did; its owners asserted that it had done 1,000 ems in ten minutes, but 4,000 was the most for any hour of which a record was kept.

Aldine Club.—A club of publishers, authors and printers in New York, having a club-house in Lafayette place. The condition of hostility between authors and publishers which seems to be chronic in England, of which Campbell's toast to Napoleon, at a time when that country was at war with France, because he had shot a bookseller, is an early example, and of which the novel Mr. Meeson's Will and the periodical called the Author, carried on by Besant, are recent ones, does not exist in New York, and the publishers, authors and printers form in this club a very pleasant and interesting society.

Aldine Type.—A type somewhat resembling Roman, but heavier in face and somewhat condensed.

This line is in Aldine.

Aldus Manutius, a very celebrated printer at the beginning of the sixteenth century, who practised his art chiefly in Venice. Aldus is a contraction of Theobaldus, and in this abbreviated form he and his family are better known than under their full name. He had for his second name Pius. He was born at Bassian, a small town in the duchy of Sermonetta, of a good family, in 1446 or 1447. He was in early life the tutor of Albertus Pius, who afterwards supplied him with the means to begin his press. He went to Venice about 1488, it is supposed, and in 1494 began printing. He was a man of great learning and unwearied industry, and his work is characterized by correctness of text, care in printing and good typographical appearance. He surrounded himself with the best scholars of the day and lectured upon the classics to the students who congregated in the town. After Constantinople was captured by the Turks multitudes of Greeks fled to other parts of the world, and some of the most learned settled in Venice, giving him much assistance in the preparation, collation and proof-reading of Greek works, in which he accomplished much, the majority of his publications being in that language. To him we owe the character known as Italic by the Latin and English nations, and Cursiv by the Germans. It is said to be formed upon the handwriting of Petrarch. So great was his partiality to this character that he composed his prefaces and introductions in it, and sometimes even whole books. He proposed a Bible in Greek, Hebrew and Latin, being the first who had thought of a polyglot Bible, and he also brought out an introduction to the Hebrew tongue. His Greek is characterized by Mattaire as being "large, round, beautiful and elegant; adorned with frequent ligatures, which added great beauty to his editions." The present system of punctuation was practically devised by him, as the points before employed were few and their use not well regulated. His mind was entirely taken up by his calling. As soon as he could transact whatever business was necessary in the morning he would retire to his study, where he occupied himself in revising his Greek and Latin manuscripts, examining proofs, and reading and answering letters from the learned in all parts of the world. To prevent interruption from idle callers he had an inscription over his door which read thus:

ALDUS MANUTIUS.

"Whoever you are Aldus earnestly entreats you to dispatch your business as soon as possible, and then depart, unless you come hither, like another Hercules, to lend him some friendly assistance; for here will be work to employ you and as many as enter this place."

It is not known that he published anything between 1510 and 1515, as the country was in commotion, and in the latter year he died, a great loss to literature and the printing art. He left little property, as he had spent his income in trying to bring out new works, to purchase manuscripts, and to relieve want. In 1500 he married the daughter of Andrea d'Asola, and when he died in 1515 d'Asola succeeded him. This he did with great ability, assisted by his two sons Francesco and Frederico, during the minority of the children of Aldus from 1516 to 1529. D'Asola died in that year, and the printing-office was closed until 1533, when the sons of d'Asola and Aldus opened it in partnership, Paul Manutius taking control.

Paul Manutius was the third son of Aldus, and was born in 1512, being, as a previous writer remarks, "in no respect inferior to his father in learning and typographical skill." Their press was very fertile until 1536, when dissensions arose, which lasted till 1540, Paul Manutius then carrying on the business for himself and his brothers. In 1556 he was asked to take the direction of the printing-office of the Venetian Academy, and in 1562 he was invited to Rome to conduct the Vatican press. He died in that city April 6, 1574. He was distinguished for the grace and beauty of his style, and wrote much, particularly a commentary upon Cicero. His business was continued by his son, Aldus the younger.

This son received an excellent education. He was born in the year 1547. His precocity was such that he published a work in his eleventh year, which had much success. He went to Rome with his father in the year 1562, four years later published a very learned work, De Veterum Notarum Explanatione, and in 1574 he succeeded his father as the conductor of the Aldine press. In 1585 he left Venice, setting up his press the next year at Bologna, although the office in Venice was still going on under the direction of Nicolai Manassi. When Sixtus V. died in 1590 his successor, Clement VII., ascended the papal chair, and invited Aldus to take charge of the Vatican printing-office, which he did. He took there his presses and his library, which consisted of 80,000 volumes. Seven years afterwards he died, being then fifty years old. He had been professor of eloquence in Venice, Bologna, Pisa and Rome, but, it is said, without success, and gave much attention all his life to literature. It has been observed that the later works of Paul Manutius and his son are less remarkable for correctness than those of the founder of the house, and many of the last ones betray signs of negligence. After the death of Paul the younger Aldus almost entirely abandoned the dolphin and anchor, which had been the trade-mark of the house, and assumed the arms which had been granted to Paul by Maximilian. The former device was borrowed from a medal of the Emperor Titus. The dolphin represents activity and the anchor steadfastness. The last of this race died deeply in debt, and his presses and other implements were seized by his creditors and sold. The house had then existed for upwards of a hundred years, and reflected the highest credit upon Italy for the quality of its work and the encouragement it had received. The library represented the savings, and if it was as large as represented must have had a value of at least $200,000 — enough in that period, when a few pence paid for the day's work of a man and the readers were so few, to have accounted for the downfall of the house.

Alexander, Charles, at one time one of the most prominent publishers in the country, was born in Philadelphia in 1797. He was apprenticed to Zachariah Poulson, and after finishing his term of service began business for himself at the location and with the types and presses formerly used by Benjamin Franklin, at the corner of Seventh and Market streets. In 1825 he established the Saturday Evening Post, in 1830 Godey's Lady's Book and afterwards the Daily Chronicle. It is said that he first introduced the Napier press in Philadelphia. He died September 29, 1866.

Alexander, History of. — A block-book, said to have been the first done in Europe. It was executed at Ravenna, Italy, in 1284 and 1285, by Alessandro Alberico Cunio and Isabella Cunio, twin brother and sister. There were eight blocks.

Alexandra Press.—An iron hand-press which resembles the Albion press.

Alfabeto (Ital.).—The alphabet.

Algebra, a kind of universal arithmetic, in which the numbers or things to be computed are represented by symbols instead of by figures. Each character may represent anything, the first letters of the alphabet being appropriated to the known and the last letters to the unknown quantities. Thus a may represent the increase in the population of the United States for the last century, and x for the next century. Joined together they represent as $a+x$ the increase for two centuries from the beginning of the time thought of. There are multitudes of cases in which such symbols prove useful, and the development of the higher mathematics is greatly due to the problems which this science solves of itself and those in which it assists the other departments. In a printing-office it is one of the most difficult kinds of copy to set, owing to the fact that there are many strange characters, and that calculations must be justified in. Thus a and b, both of the second power, multiplied into c, and having eleven added, are to be expressed as divided by g, x and y, with twenty-two added. This would be thus expressed:

$$\frac{\overline{a^2 + b^2} \times c + 11}{g + x + y + 22}$$

It will be seen that there are four lines here. Beginning at the bottom there is the denominator, and above it the brass rule or the line of dashes; then comes another line, with two superiors justified in, and over the first part of this series of symbols a line, indicating that the characters directly beneath it are to be considered together. The middle line is one of two or three em dashes of the same body, although it would look better on half body, while the line at the top should be only the thickness of the lead, so that space rule or brass rule can be used. Offices completely equipped for this work use brass rule only. There are other signs, some of them of great size, which must be considered in planning the line. Some characters are inseparable from others, and therefore the two must be written together. Where algebraic expressions have several justifications it is well to set the letters at first in a long line, placing them upon a galley until there is probably enough to fill the width of the book. The letters being all set, and the copy examined carefully to see how many lines in depth a complete problem will require, the type is handled so that it is in the most compact shape possible, while giving the matter clearly. The justification must be a very careful one. Quadrats should be used as bricks are in architecture, so that where two-em quadrats lie on their side over each other the next one shall be up and down and bind them. The brass rule or space rule used should be of the thickness of the leads which are employed on the work, so that there need be no time lost in justifying them in. There are two kinds of brass rule used. One has the line in the centre, and is employed where letters like $a\ c$ are over $x\ y$. There is a good shoulder to each of these characters, and the rule should be midway between the bottom of one and the top of the other. But if $g\ y$ is over $a\ c$ the line should be at the bottom, and if $a\ c$ is over $d\ h$ the line should be at the top. The correct use of this must be determined by a consideration of all the characters over or under which it is to be placed. The superiors, or indications of higher power, should be of nonpareil when the type is pica, and pearl when it is long primer, as they justify in more easily, in case they are not cast upon the body. Letters are also employed as superiors and inferiors in algebra. The alphabetical letters used are usually in Italic and in lower case, but in some algebraic expressions Roman and Greek letters are required and in others Italic capitals are used. The ordinary characters in algebra are as follows: Plus, or more, is + ; minus, or less, is − ; = signifies equal, but is not the parallel turned sidewise; × is the multiplication mark, but is generally omitted between two alphabetical letters; ——, a long dash at the top of a line, over other characters, is called a vinculum, and signifies that they are to be considered together (it may also be used at the side); ÷ is the mark of division; 7 or ⊏ is a sign of preponderance or majority; the same overturned is a sign of minority; √ means the root of anything, and with a figure in its hollow, as a 3, indicates the cube root, or with any other figure the corresponding root; ± is either plus or minus; ~ shows the difference between quantities, without indicating which is to be subtracted from the other; ∝ indicates that one quantity varies as another; Σ shows that the sum is to be taken. Other signs are: > greater than; < less than; ∴ therefore or hence; ······ or — — — — — — and so on; ( ) a compound expression treated as a whole; [ ] and { } have the same signification. These three characters may be of any size, sufficient to contain the part of the problem to which they relate, and when one part is used the other must also occur. They may all three close together, as)]}, but in this case, of course, they do not open together. Some mathematical signs may be employed as superiors, but their use is so infrequent that it is better to justify in pearl or agate than to have them made. In most mathematical works it is allowable to use smaller type to get in an example or problem that would be injured by division, the same as in a table, but the entire example must be uniform. These are by no means all the signs which have been used by algebraists in different countries and at different times, and the compositor will do well to stick to his author, as each one has a little different theory of expression from any other. Some of these signs can be found at the type-founder's; others must be made for the work, or be temporarily manufactured by the vise, file and knife. Particular care should be taken by the workman not to allow great, unsightly gaps in his page, because the example did not go across. It is frequently possible to run down other matter at the side, or to put two or three examples in one width. The compositor is always paid an extra price for setting algebraic work.

Algebraic matter should be charged for to the customer at double price in works upon algebra. But when algebraic formulæ occur in works upon other subjects they should be set on time, as they can be put together very slowly by the ordinarily good compositor.

Alignment.—The exact correspondence at top and bottom of letters of similar size.

Alinéa, l' (Fr.).—A paragraph.

All Along.—In sewing a book, where the thread passes from kettle-stitch to kettle-stitch, or from end to end in each sheet.

All Got Up.—In England, a term used to indicate the completion of copy or the exhaustion of the type in cases.

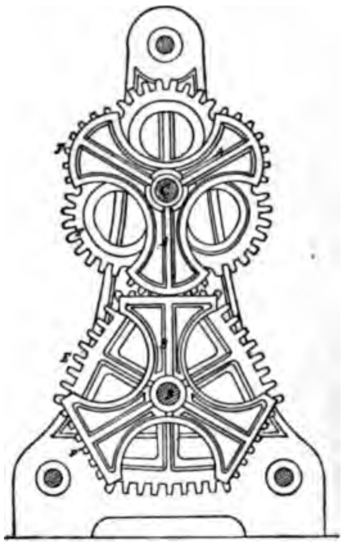
All In.—When all the type available has been distributed.

All in Hand.—When all the copy has been given out to the compositors.

All Out.—When copy or type is exhausted, and the men can do nothing further on a particular work.

All Up.—When the copy is all in type, or the type is all used, it is said to be all up.

Allen Press.—A press patented in 1867 by Edwin Allen, of Norwich, Conn., in which the form is upon a flat bed, but is rotary. A portion of the lower cylinder B is planed away, so that a small form can be locked up in it, and the impression cylinder A has a concavity where it touches the other in the revolution. It was intended for envelopes and other small jobs, and the experimental machines worked well. Mr. Allen, the inventor, was a universal genius, and made a number of improvements in the arts. He for a long time did a very large business in cutting and printing spools in Norwich. He died on January 4, 1891, aged seventy-nine.



ALLEN PRESS.

Alley.—The space between two stands or two rows of stands. According to one writer it is also termed a corner, but there seems to be no confirmation of this.

Alligator Press.—A job press used in the United States between 1845 and 1860, before it was driven out by better machinery. It closed the tympan and platen very rapidly, and often seriously injured the feeder.

Allineare, Allineamento (Ital.).—Alignment.

Allonge, l' (Fr.).—A fly-leaf.

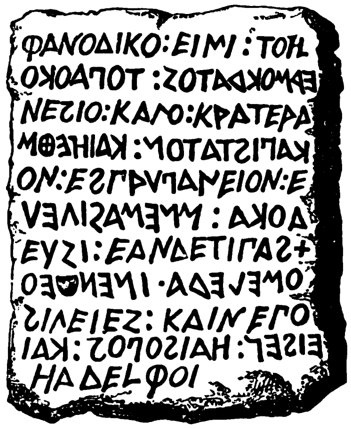
Almanac.—A pamphlet or small book which gives the succession of days or months of the year, with other information. This has been in all countries, and in each century since the fifteenth, a great resource of the printer. It was the first work done in the Middle Colonies, and among the first done in New England. In 1639 there appeared in Cambridge an Almanack Calculated for New England, by Mr. William Pierce, Mariner. In Poor Richard's Almanack the wit and wisdom of Franklin appeared. The popularity of the almanac is not now so great here as it is in England or France, most of the old ones having been discontinued, including the American Almanac, although another periodical of the same name has since been begun. Early almanacs were frequently only broadsides, but for many years they have always appeared folded. The decrease in valuable almanacs is owing to the fact that proprietors of patent medicines have for the past fifty years issued almanacs, in which their remedies are extolled, for gratuitous distribution. Some of these concerns place more than a million copies in circulation every year.

Alphabet.—A contraction of the Greek name of the first two letters, alpha and beta, used to indicate the names of all the letters which occur in writing a language. The number of these varies in different countries, and even in the same country at different times. In English there are now twenty-six, but in the time of Spenser they were only counted as twenty-four, j and v not having been separated from i and u. Still earlier the w was added, that being two u's or v's together. Going yet farther back, before the Conquest, and extending two centuries later, there were twenty-three letters, w existing, although afterwards driven out, q not having been introduced, and two forms of th being separate from the combination which we now use to indicate its sound. These changes have been common in all languages. Cicero speaks about the twenty-one letters of the alphabet. The words vary, as well as their meaning, and the alphabet itself does not remain stationary. It is supposed that the original alphabet was derived from Phœnicia, and its invention is attributed by tradition to Cadmus. It probably will always remain impossible to tell just when and where this most important discovery was made, as it may have been simultaneous in several places, each originating a portion and convenience showing the propriety of their union. The line of descent for letters and the arts is, for Europe, through Greece. The language of that country had, during its classical age, twenty-four letters, some having been previously added to the original ones. The order of the Greek letters is a, b, g, d, ĕ, z, ē, th, i, k, l, m, n, x, ŏ, p, r, s, t, u, ph, ch, ps and ō. It will be seen that many have been transposed from their original positions to the places where they are now found in modern languages. Only one of the important modern languages (Russian) has characters based directly upon the Greek. Almost all of the tongues of modern civilization are indebted for their alphabet to the Latin. There exist two forms of face, the Gothic and the Roman, but although there is a Northern origin given for the alphabet in the Germanic tongues, and its forms appear different, yet the order and powers of the letters are alike from the Baltic to the Mediterranean. The commonly received story about Cadmus is that he was a Phœnician, who settled in Bœotia about fifteen hundred years before Christ, where he built the city of Thebes, and that he was the first who taught the Greeks the use of alphabetical symbols. Before his day hieroglyphics and arbitrary marks were used to assist the memory, as the Peruvians much later employed them, and as the North American Indians do at the present day. It seems altogether probable that writing was invented in this south-western corner of Asia or north-eastern corner of Africa. There the oldest preserved literal inscriptions have been found, and both tradition and authentic history afford proofs that it had its origin there.

Every printed alphabet is formed from the written characters, formalized, the variations between capitals and small letters not originally existing. Enthusiastic writers have believed that they have found the origin in a resemblance between the letter and the object it denotes, but in a language with ten or twelve thousand words it will always be found easy to trace some likeness between a character and one of five hundred or a thousand words which take this sound as an initial. Thus B bears a resemblance to a bow; but in practice we find many forms, even where origins may be supposed to be different. They have been altered somewhat, even within a couple of centuries.

The study of the alphabet by itself is, however, a task for the literary antiquary. The student of printing and bookmaking is only concerned in it as it affects the production of books. Only highly-civilized nations have any considerable amount of literature, and it fortunately happens that there is a general concurrence between them as to the characters. The alphabet used in English, French, German, Italian, Spanish, Flemish, Dutch, Danish, Swedish, Icelandic, Welsh, Portuguese, Hungarian and Bohemian is alike, as well as that of some lesser languages of Europe. It is the alphabet of all real knowledge, as science knows no other, and those who use it are spread over one-third of the globe and embrace one-fourth of the population. Three other alphabets are used in Europe—the Russian, Greek and Turkish. Many of the languages of Asia and Africa have their own alphabets, but only one of them, that of China, is used for more than thirty or forty millions of people. That can hardly be called an alphabet, but it is rather a method of denoting ideas by words. Apart from these tongues there is little written or printed. Two forms of letters are used in most alphabets, capitals and small letters, but not in all. Hebrew, for instance, has no capitals. Some of the capitals are almost exactly like the lower case, but others, like L and l, E and e, R and r, are very unlike. Small capitals are a variation on capitals, and Italics on Roman. In the printer's language there are five alphabets to a common font of type—Roman and Italic capitals, Roman and Italic lower case and Roman small capitals. There might also be Italic small capitals.

A very early specimen of alphabetic writing is that contained in a tablet disinterred upon a promontory called Sigeum, situated near ancient Troy. It is engraved on a pillar of beautifully white marble, nine feet high, two feet broad and eight inches thick, which, as appears by an excavation in the top and the tenor of the inscription, supported a bust or statue of Hermocrates, whose name it bears. It is supposed that this tablet, engraved on stone, is three thousand years old. It has been the custom of most Eastern nations to write from the right side to the left, but, as will be seen by this stone, the early Greeks had already deviated from the mode of the Oriental writers in this particular. The inscription begins at the left, proceeds to the right, then commences for the next line at the right and goes to the left. Thus it continues to go on, each alternate line beginning at the same side as that on which the preceding line finishes.



THE SIGEAN INSCRIPTION.

The proportion of letters in English, French and German differs widely. They are here given for comparison:

	German.	French.	English.
a	1,500	1,800	2,000
b	600	450	500
c	145	650	750
d	1,560	750	650
e	5,400	3,000	3,000
f	420	400	650
g	840	550	500
h	660	500	1,600
i	2,160	2,000	2,000
j	145	300	250
k	360	120	250
l	840	1,100	1,000
m	900	1,100	800
n	3,380	2,000	2,000
o	840	1,100	2,000
p	240	600	500
q	60	400	100
r	2,400	2,000	1,600
s	1,300	3,000	2,000
t	1,500	1,400	2,500
u	1,380	1,200	2,000
v	420	500	350
w	540	200	1,000
x	60	300	100
y	95	300	550
z	360	100	200

It will be seen by this that the letter most used in German, which leads also in English and French, requires as many characters in a font as the next two together, and that the second letter, n, has half as many again as it needs in the other two languages. The order in frequency in the three tongues is:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
German......	c	n	r	i	d	a	t	u	s	m	g	o	l	h	b	w	f	v	z	k	p	c	j	y	x	q
French.......	e	s	i	n	r	a	t	u	l	o	m	d	c	p	g	h	v	b	f	q	x	y	j	w	k	z
English.......	e	t	a	o	i	s	n	h	r	d	l	u	c	m	f	w	y	g	p	b	v	k	q	j	x	z

The first heavy mark in each line indicates that one-half the letters in actual composition are comprised in those thus cut off, and the second mark shows that three-quarters are to the left. Thus it will be seen that in German one-half of all composition in small letters is done in e, n, r and i, and three-quarters in these and d, a, t, u and s additional; in French, half in e, s, i, n, r and a, and three-quarters in these and t, u, l and o additional; while in English half are in e, t, a, o, i and s, the three-quarters being made up of these and n, h, r, d and l. This study is one of importance, for a part of the letters must be left in the case, so that it may be adapted to different work. If this proportion thus left is too great, the characters do not become evenly worn, and there is a great variation in their height to paper, making the impression very irregular.

Alteration of Margin.—At one time, when large paper copies were published of almost everything that interested a certain class of students or literary men, alterations of margin were common. They have become less so now, but are still frequent enough to be considered. Books on small pages, after having been worked off, so far as their regular edition is concerned, are then adapted to a new and larger size of paper, the latter being far fewer in number than the first. It is unusual to do this at present with large octavos or real quartos, as the book would then be too large, but 12mo, 16mo and smaller are the sizes most used. In such work the chase should be much larger than the original edition requires, at least four or five inches longer if only four pages are to be worked, and six or eight inches longer if eight pages are to be handled at a time. In this kind of work it is much better to have the whole of the signature printed at once, and then turned, than the other way. Fold the sheet on which the larger paper is to be printed, and mark with a lead pencil where the top, bottom, inside and outside of the page will come, and then with a bodkin punch a hole completely through. The margin will then be right everywhere if this plan is followed. The furniture for the head and back should be in metal, and each should be in one piece, if possible. If the form is taken from the press it should be carefully unlocked and the pieces put in one by one, the matter being pushed up against them and quoined before another page is begun. It is better, however, to do this on the press, and then there will be no danger of letters dropping out.

Alterations.—It is the duty of the office to see that no proof of displayed work is submitted to the customer unless it be done in a workmanlike manner. If it is badly or tastelessly arranged the office should bear the loss of making the alteration and not the customer, unless it has been done in accordance with his special directions. The office, as an expert, should decide what is or what is not workmanlike, the standard being, not the production of some specially skillful workman, but those of the average of ordinary good compositors. If the work is decided to be displayed fairly, then the customer should be charged with the expense of all alterations. When the suggested alteration is trivial it may not be worth while to insist upon this claim; but in all cases the customer should be forewarned that he buys only the labor of good average workmen, and that the expense of all improvements he may suggest is justly chargeable to him.—*De Vinne.*

Alterations should be charged for at double the price of hour work. It must be considered that while this is going on the stone is occupied, a special revision must be made by the proof-reader, and there must frequently be lifting of cases, galleys and forms. More of the foreman's time is also required.

Altezza del Carattere (Ital.).—The height of the letter.

Alum is sometimes used by compositors to contract the skin on their fingers, so that the type can be held more securely in distribution. The matter is never so slippery as to require the use of this substance except when it has been badly rinsed, the lye still remaining on the surface and in the crevices, and the only value of the alum is as a reminder to the foreman that the form should be locked up again, taken to the trough, and washed a second time.

Alvord, Corydon A., a celebrated printer of New York, was born in Winchester, Conn., about the year 1812, and learned his trade in Hartford. He left that city soon after the expiration of his time and went to Philadelphia, but in 1844 came to New York and opened an office at the corner of John and Dutch streets. At the beginning, and for a number of years, he only did presswork on books, but afterwards laid in type for use. His work was much sought after, as he took an extraordinary degree of pains with it, and in the management of wood-cuts he was undoubtedly the most skillful printer of his day in the country. His was the last place in New York where hand-presses were extensively used. He took an active part in the establishment of the Master Printers' Society, since known as the Typothetæ, and became its second president. He wrote well, and several times spoke at length upon subjects connected with the art. Through the misconduct of those in whom he placed confidence he was obliged to retire from business in 1871, his establishment being taken by the New York Printing Company, and returned to Hartford, where his last years were spent in preparing a local history of Hartford and Winchester. He died November 28, 1874.

CORYDON A. ALVORD.

Amateur Printers.—Those who follow the calling, not with an intention of making their livelihood thereby, but of earning a little money with which to supplement their income from other sources or to lessen the expense that printing would otherwise be to them. It is inaccurate to apply this term to those who have never been apprenticed to the trade, or who have little practical skill, but who carry it on as a livelihood. Many of our most enterprising employing printers cannot make ready a form, read a proof, set a line of type or feed a Gordon press. They have, however, learned how to manage the business successfully, and to turn out their work well. Such men are not amateurs, no matter whether they ever served a day or not. The number of amateurs in every city and considerable town in the United States is very great. They have almost entirely swallowed up the small and easy work, and occasionally try something larger. Dealers exist in the principal cities who make a business of supplying them with material. Fonts such as serve the trade are cut into two, presses have been devised that can be sold at all prices, from $5 to $100, and special cases and other articles are made for them. One founder who caters to the amateur trade makes letters of half the usual length to accommodate their cases and presses. Most of the work turned out by amateurs is of a wretched quality.

America.—The West Indies were discovered about forty years after the invention of printing, and a few years after the conquest of Mexico a press was set up in the city of that name. Lima, Peru, was the next locality. The English colonies to the north began printing at Cambridge, Mass., in 1639; Havana had a press in 1787, and Montevideo in 1807. The United States has now grown to be the greatest nation in respect to printing in the world, although it does not produce as many books, properly so called, as either England, France or Germany. Canada does a great amount of printing, as do also Brazil and Chili, but the other nations are comparatively inactive. See under UNITED STATES and under the respective towns.

Américaine (Fr.).—A script, so called after the Americans.

American.—The proposed name of a size of type of one-point body. It is not likely that any type will ever actually be cast as small as this; the nearest approximation to it could be attained by setting the words in larger type and then photographing them down. See MICROSCOPIC PRINTING.

American Hard Packing.—This refers to the system of making ready in vogue in America in contradistinction to the usual style adopted in England.—*Jacobi*. See PRESSWORK.

Ames, Joseph, a distinguished antiquary, who wrote an extensive book, entitled Typographical Antiquities, being an Historical Account of Printing in England, with Memoirs of our Ancient Printers and a Register of the Books Printed by them from the Year 1471 to 1600, with an Appendix concerning Printing in Scotland and Ireland to the same Time. Very much of our knowledge of printing in the British Islands is derived from this learned work, which was published in 1749. Mr. Ames was born at Yarmouth, January 23, 1688, and was originally a plane-maker. Afterwards he became a ship-chandler and adhered to this business all his life. He wrote two other books. He was a Fellow of the Royal Society and secretary to the Society of Antiquaries. He died October 7, 1758.

Amperzand.—The character &; and, per se, and. That is, and, by itself, and. There are some neat verses upon this character.

Amphibie (Fr.).—A printer who works both at press and case.

Ana.—A collection of the sayings of certain celebrated or witty persons. It is affixed to the names of persons or things, as Johnsoniana, Scaligeriana.

Anaglyptography.—The art of so engraving as to give the surface an embossed appearance, as if raised from the surface of the paper. Used in representing coins, medals, bas-reliefs, &c.

Anagnostes.—Those who, in the printing-office of the Brothers of the Life in Common and elsewhere in the early ages of printing, read aloud the copy to the compositors. It was the practice to read to several in turn, as the reading could be done much faster than the composition.

Anastatic Process.—A method of reproducing, from anything once printed, another series of impressions. The book, or the matter which was printed, was treated with an acid and submitted to pressure against a zinc plate, which thus had a design fixed upon it similar to that of a lithographic plate.

And, in its form &, is the only one of the once common contractions still in use, except in some special trades or occupations. Good present usage only tolerates it in the names of firms, as Brown & Smith, and in the word &c., for et cetera. Even in both these cases it is spelled out by many. The older form of this was &, which showed its resemblance to et, the first letter being perfect, and the second nearly so. Our present character bears no resemblance whatever to the word.

Anderson, Alexander, M. D., the father of American wood-engraving, was born near Beekman's Slip, New York, on April 21, 1775, two days after the first bloodshed in the War for Independence had occurred at Lexington and Concord. His father, John Anderson, was a Scotchman, who had come to this country some little time before and had married a New England woman. He differed in politics from most of his countrymen in America at that time, as they were distinguished for their loyalty, while he was, at the time of his son's birth, the publisher of a patriotic paper which supported this country's cause and was named the Constitutional Gazette. He continued to publish it in opposition to the loyal sheets of Gaine and Rivington until the British took possession of New York in September, 1776, when he was compelled to fly, with his books and printing materials, nearly all of which were lost before he attained a place of safety. At the age of twelve years young Anderson began to use the graver for his own amusement. He was a timid lad, shrunk from asking questions and gained information by silent and modest observation. Peeping into the windows of silversmiths he saw the shape of the graver and the method of manipulating it in the lettering of spoons, and rolled-out copper cents supplied him with plates for his first efforts. Some of his earlier essays in the art were in making copies of anatomical figures from medical books. His father perceived this proclivity towards medicine with pleasure, and deprecating the lad's manifest love of art he allowed him to make preparations for the profession of a physician. In May, 1796, he received the degree of medical doctor from the faculty of Columbia College. The subject of his address on that occasion was "Chronic Mania," the theories which he then advanced concerning its cause and cure being now long-established facts in medical science. Soon after he began his medical studies, at the age of about seventeen, his proficiency in art had become so great, notwithstanding the many difficulties in his way, that he was employed by William Durell, a bookseller, to copy the illustrations of a popular little

ALEXANDER ANDERSON, M. D.

English work entitled the Looking-Glass for the Mind. The engravings which adorned it were made on wood by Bewick, the father of modern wood-engraving. Up to this time Anderson's engravings had been made on type metal, and he had no idea that wood was used for the purpose. When he had completed about half the illustrations he was told that Bewick's pictures were engraved on boxwood. He immediately procured some pieces of that wood from a rule-maker's shop, invented proper tools, experimented, and, to his great joy, found the material much more agreeable to work upon and more easily managed than type metal. Two of these wooden blocks are still in existence. In the first year of his practice of medicine Dr. Anderson drew and engraved on wood in an admirable manner, even when compared with the art at the present day, a full-length human skeleton, from Albinus's Anatomy, which he enlarged to the length of three feet. This, it is believed, is the largest fine and carefully elaborated engraving on wood ever attempted, and has never been excelled in accuracy of drawing and characteristic execution. When Dr. Anderson was twenty-three years old his family all died of the yellow fever. He was attacked while in attendance upon the physician with whom he had studied and who had been prostrated by it. Both recovered, and Anderson made a voyage to the West Indies to visit his paternal uncle, Alexander Anderson, who was then the king's botanist at St. Vincent. On his return he resolved to abandon the practice of medicine and devote himself to engraving, for which he had conceived an irrepressible passion. At that time John Roberts, an eccentric Scotchman and friend of Anderson's deceased father, who painted miniatures and etched and engraved on copper, was a clever musician and mathematician and a competent draughtsman, became his instructor. Anderson preferred wood-engraving, but the demand for it being small he practised on copper, and under Roberts's instruction gained great proficiency. His skill was well attested by the frontispiece to Robertson's History of Charles V. and a portrait of Francis I. These he engraved in the year 1800 for an edition published in New York by Hopkins. But Roberts's habits were so irregular that Anderson did not remain with him long, and finally his master's intemperance compelled him to give up the advantages which he might have derived from that artist's practical suggestions. Anderson established himself as an engraver soon after leaving Roberts, and up to the year 1820 he used both wood and metal, as occasion required. He illustrated the earliest editions of Webster's Spelling Book, long a leading elementary book in the schools of the United States. In 1857 a new and more fully illustrated edition of that work was published, the engravings being executed by Anderson from drawings by Morgan, who was about eight years his junior. During his long and busy life Dr. Anderson engraved many thousands of subjects. His last engraving on copper was made about the year 1812, to illustrate a quarto Bible. The subject was the "Last Supper," from an English design. From that time he engraved on wood exclusively, and found continual employment until called upon to lay aside every implement of labor forever. In the spring of 1859 he removed from where he had lived for over thirty years, going to Jersey City, where he dwelt with a married daughter. He was then eighty-five years of age. At that time he issued a new business card, drawn and engraved by himself, with the appropriate motto: "Flexus non Fractus"—"Bent, not Broken." He died on January 17, 1870, the birthday of Franklin, whom he might have seen. Their two lives extended over one hundred and sixty-four years, Dr. Anderson's age at the time of his death being ninety-five. He was extremely regular in his habits, and would not sit up after 10 o'clock at night, he used to declare, "to see an angel." His reminiscences of the past were extremely vivid. He was acquainted with most of the literary and professional men of the early part of this century, and had been intimate with Irving from a boy. From him Irving learned to play the flageolet. In person he was a little below the medium height, rather thick set, and presented a countenance always beaming with benevolent and kindly feeling.

Andrews, Ezra R., a printer of Rochester, N. Y., was born in the town of Gates, Monroe County, in the State of New York, March 16, 1828. His father moved into Rochester, then known as Rochesterville, in that year. The son attended the public and private schools there until he was fourteen years of age, when he entered the office of the Rochester Democrat as a feed-boy on an old-fashioned double-ended Adams press. He continued in that place as apprentice and journeyman for eleven years, when in 1854, with three others, he went into business for himself. The office he established was a small one for general job printing, with two hand-presses. One after another of the partners were bought out, and since 1871 he has been conducting a book and job office and bookbindery which is one of the largest in the country outside of the great cities. For four years he was a member of the City Council, and the last year its chairman. He was the candidate of the Republican party for Mayor in 1870, but was defeated by a small majority, being opposed by the liquor interest. He was a delegate to the first convention of the Typothetæ at Chicago in 1887, and has since that time annually been chosen to represent his local organization in the deliberations of the United Typothetæ. He has also been a member of its executive committee from the beginning.

EZRA R. ANDREWS.

Anfangsbuchstaben (Ger.).—Initial letters.

Anfangskolumne (Ger.).—The beginning page.

Anfangszeile (Ger.).—Initial line.

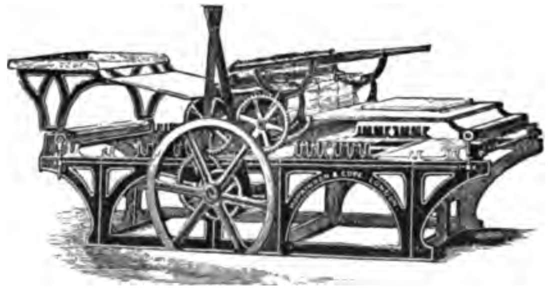
Anfeuchten (Ger.).—To wet, to moisten.

Anführen [einen Satz] (Ger.).—To mark with quotations.

Anführungszeichen (Ger.).—Marks of quotation.

Anglaise (Fr.).—A script of a certain style, so called because the English are believed by the French to write thus.

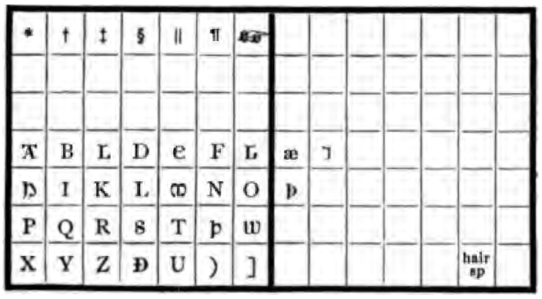
Anglo-French Machine.—A perfecting cylinder press, used in England, based upon the plans of the Napier press, but altered in France. There are two impression cylinders, the sheet being carried from one



ANGLO-FRENCH MACHINE.

to the other by grippers. The cylinders are of small size, nearly the whole of their surface being utilized for the impression. They alternately rise and fall in order to clear the form. This movement is effected by a rocking-frame, fitted with a knuckle joint, the upper portion of which is secured to the top of the side of the machine. When the joint inclines to an angle the cylinder frame, assisted by springs, ascends; when perpendicular the frame is forced down. The sheet is not printed as the bed goes in, but as it goes to the end. Grippers here seize it and then release it to the outer form cylinder, also supplied with grippers. From this it is thrown upon the delivery-board. An advantage of the Anglo-French machine is that the tables have a longer travel than the other machines (and the rolling is better, as the whole of the inkers, four in number, completely clear the form). There is a set-off sheet apparatus, which is an arrangement for feeding in a set-off sheet with each sheet to be printed. This meets the sheet when it is entering on the second cylinder, and the set-off paper passing round with it prevents the ink on the printed side of the paper setting off on the cylinder and from it to the following sheets.

Anglo-Saxon.—This character, of which one or two fonts ought to be in all large offices, has been cast since 1567. The language, which is variously styled Anglo-Saxon and Old English, was that spoken in England from the invasion of the Jutes and Angles down to about 1150, when it began to undergo changes to the shape which it has in modern English. It lasted six hundred years in England, and had previously existed on the mainland.



*	†	‡	§	‖	¶	☞							
A	B	C	D	E	F	Ᵹ	æ	⁊					
H	I	K	L	M	N	O	Þ						
P	Q	R	S	T	Þ	W							
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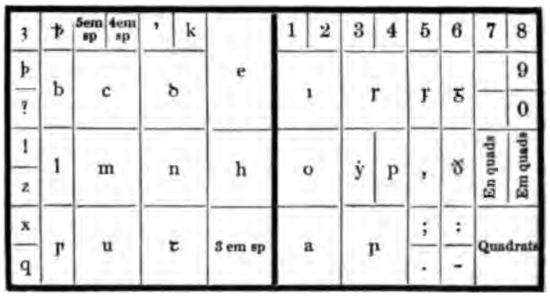
ANGLO-SAXON UPPER CASE.



ANGLO-SAXON LOWER CASE.

The Anglo-Saxon alphabet consists of twenty-three letters, or, with the addition of Æ, of twenty-four letters, following much the same order as the English. They are as follows:

A. S.	English.	A. S.	English.	Pronunciation.
A	A	a	a	a as in fat.
B	B	b	b	b
C	C	c	c	c as in cot.
D	D	ꝺ	d	d
E	E	e	e	e as in met.
F	F	ꝼ	f	f
Ᵹ	G	ᵹ	g	g as in got.
H	H	h	h	h
I	I	ı	i	i as in pin.
L	L	l	l	l
M	M	m	m	m
N	N	n	n	n
O	O	o	o	o as in not.
P	P	p	p	p
R	R	ꞃ	r	r
S	S	ꞅ	s	s
T	T	ꞇ	t	t
U	U	u	u	u as in full.
W	W	ƿ	w	w
X	X	x	x	x
Y	Y	ẏ	y	y as in lyrical.
Þ	Th	þ	th	th as in thing.
Ð	Th	ð	th	th as in smooth.

Some writers have discarded the peculiar marks for th, and indicate the sound as in thing by a colon laid under the t̤h as here. The other th is then unmarked. The acute, grave and circumflex accents are all used at times, but there is not much regularity among writers in their employment. There is, too, none of that certainty of spelling which is found in modern English and French; the authors wrote as seemed good to them. Abbreviations were used for and, that, or and by. To denote the omission of an m they made a stroke over the preceding character, like a long accent. The only signs or notes of distinction which they had were one dot at the end of each sentence or of each line of a poem, and three at the end of a complete discourse. The best guide for studying the grammatical structure of the language by way of comparison is German. There are dictionaries and grammars of Anglo-Saxon, but more of the literature remains in manuscript than has been printed. As compared with English it is highly complicated, our present language having been changed, first, by dropping old grammatical forms, and, second, by adding new words from other sources.

Angolo (Ital.).—A mitre.

Aniline Colors.—A great number of new colors, some of them of much brilliancy and beauty, of which the basis is coal-tar, have been added within the last thirty years to the stock of the printer. They are clean and good working colors, and have the property of covering much surface for a given weight. Unfortunately, however, they are not permanent. When the work is to be preserved for a short time only they serve the purpose very well, but exposure to sunlight or even to broad daylight soon causes them to fade. Hence there are certain classes of orders on which they never can be used. See COLOR and INK.

Anisson-Duperron, Etienne Alexandre Jacques, the inventor of the first hand-press with modern improvements, was born in Paris in the year 1748. In 1783 he was appointed director of the Imprimerie Royale, and in 1790 published a letter on the printing of assignats. He was one of the victims of the Revolutionary Tribunal. He describes his press, which was brought out about 1785, as having one pull. It had more iron and less wood than preceding presses, and some method of obtaining a more powerful impression. French writers declare that Stanhope's ideas were borrowed from this machine.

Annapolis.—Printing was done at Annapolis, Md., in the year 1726. Previous to that time the printing for that colony had been executed at Philadelphia, by Andrew Bradford. The first printer was William Parks, who brought out a volume of laws, and then began a newspaper. In 1733 he left the colony, and there was then no printer until 1740, when Jonas Green, of the celebrated New England family of printers, accepted an offer from the government of Maryland to establish a press. He was appointed printer, and had granted to him an annual salary of £500, currency. In 1745 he began a newspaper. Printing has been continuous there ever since, but of course the amount is not very large, as the city is a small one. It is the State capital, and has seven newspapers.

Anmerkungen (Noten) (Ger.).—Notes.

Annuals.—The name of a class of books which for some years were very popular in this country. They appeared about Christmas and were usually of a light literary nature, tastefully made up and illustrated with finely-engraved prints. The first of these appeared in London in 1822, and yearly thereafter new ones were added to the list until in 1829 no less than seventeen annuals were published there. The supplementary volumes of cyclopædias and other works which appear yearly are also termed annuals.

Annonce (Fr.), **Anzeige** (Ger.).—Advertisement; notice; annonce spéciale (Fr.), special notice.

Anonym, a book in which the name of the author does not appear.

Anonymous.—Literally without a name, or nameless. It is applied to books which do not bear the name of the author. When an assumed name is given the term pseudonym is used.

Anschlagezettel, der (Ger.).—The handbill; the placard.

Ansetzblatt, das (Ger.).—The fly-leaf.

Ansetzen (Ger.).—To compose on.

Antimony.—A metal which is indispensable in type-founding. It occurs in nature generally in masses, consisting of needles, which are extremely brittle. In this shape it is a sulphuret, commonly called crude antimony. Metallic antimony, as obtained from the smelter, is not absolutely pure, containing frequently minute portions of iron, lead and arsenic. The metal is a brittle one, of a silvery white color, and with a crystalline fracture. The specific gravity is 6.86. The facility with which it is alloyed with gold, since its fumes alone render this most ductile metal immediately brittle, led the alchemists to assign to it a royal lineage, and to distinguish it by the title of regulus, or the little king. It is used in combination with lead, tin, bismuth and copper, or with the first alone, in making type, leads, furniture, stereotype and electrotype plates. It causes the compound to become much harder than lead or tin, and it possesses the singular quality of expanding as it cools, so that the melted type metal is sure to fill the mold completely, and the letter is thereby rendered very sharp.

Antiqua.—The name given to Roman characters in Germany.

Antiquar (Ger.).—Antiquarian, a term formerly applied to students of the antique, but now used in connection with a bookseller who deals in old and rare books. Der moderne Antiquar is a product of still more recent days, and is one who deals in new books on which he makes "liberal discounts to everybody" and sells to the rest of the world "regardless of cost." A sort of literary pawnbroker or book-butcher.—*Caspar.*

Antiquarhandlung, Antiquarbuchhandlung, Antiquariatshandlung (Ger.).—Antiquarian or old book business.

Antiquaria (Ger. and Lat.).—Old or second-hand books; Antiquaria aus dem Verlage, old stock of the publications of a certain bookseller; remainders, or new books reduced in price.

Antiquarian.—A size of drawing-paper, 53 by 31 inches.

Antiquarii (Lat.).—This name was given to the monks who were also scribes, and who copied books before the invention of printing; those who copied old books more especially were called antiquarii; those who transcribed new ones, librarii.

Antique.—1. A kind of type in which each line is made heavy alike, the serifs being kept in their full proportion. Antiques form very useful styles in job offices, being condensed, extended, expanded, light-face, heavy-face, &c. They were denounced by Hansard in 1825 as monstrosities. Certainly the face which he showed to justify his denunciation was a very bad one.

These words are in antique.

2. In England this expression is sometimes applied to old-style type.

3. Tooling executed without gold. It is also called blind tooling. When the expression morocco antique or calf antique is used it means that the whole of the finishing is blind. The boards must also be thick and beveled, and the edges either dull gilt or red, or gilt over red. This class of work is used extensively for religious books.

Antiporto (Ital.).—The bastard title.

Aperçu (Fr.).—Survey; sketch.

Apograph.—A copy, as distinguished from an autograph; sometimes applied to the ancient manuscript copies of books.

Apostroph, der (Ger.).—The apostrophe.

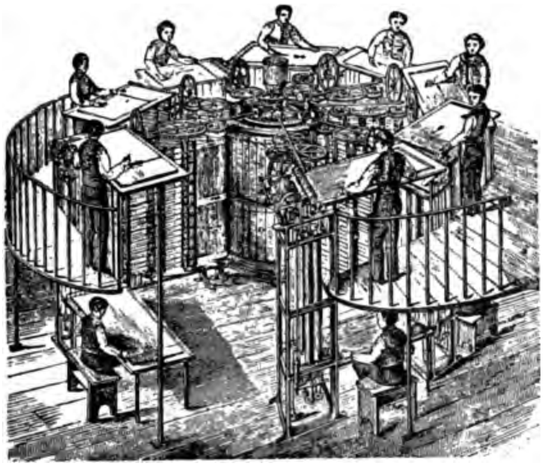
Apostrophe.—A mark used to indicate the possessive or genitive case and also employed as a sign of elision. It is in reality a comma at the top of a line. When used as the mark of the possessive case, in the singular, it comes before the final s, but after it in the plural. Thus, in John's house, the mark follows the original word or stem and is found before the s, but in the soldiers' shoes, meaning several soldiers, it is at the end. If it is at the close of a sentence or a subdivision, the colon, period or semicolon comes after it, as well as the comma. An apostrophe shows an elision or omission of a letter or letters, as in e'er for ever, Edinboro' for Edinburgh, 'tis for it is, or Gen'l for General. Some letter must be lost or dropped, otherwise the period is the proper abbreviation. Thus Lond. is a contraction for London, Geo. for George, A. M. for Anno Mundi (year of the world). But if London ought to be spelled out in analogy with other words, and the table in which it was to be printed had not enough room for it, L'ndon or L'd'n might be used, or L'p'l for Liverpool. Apostrophes form the concluding mark in quotations, showing where they end, the beginning being in inverted commas. Thus "the proper study of mankind is man" is a quotation, and this fact is shown by the four marks, two before and two after. In England the first quotation begins with a single inverted comma and a single apostrophe ends it; here two are generally used. The single comma and apostrophe are here employed for a quotation within a quotation; the quotation within this takes two again, and the next one, so continuing as long as one quotation goes within another. In England it is first one, then two, then one, and so on. The inverted commas are repeated at each paragraph, but the apostrophe or apostrophes are only used once, and then at the end. The character is generally borne off from the matter, if there is no blank between the last letter and this sign, by a thin space, but after a comma, period, or other letter having a space at its top this is not done. Many good printers do not do so in any case. When one, two or more quotations within each other end together they are separated from each other by a thin space. (See QUOTATIONS.) Some authorities on punctuation make the quotation, if not of the whole sentence, end inside of the comma, semicolon or period, and there seems to be good reason for this.

Appearing.—That part of a page which appears in print without the blank line.

Appendix.—An addition to a book, containing further information. Very frequently its contents are similar to long notes, placed there so that they shall not fill up the pages of the text too much.

Appianare, Battere (Ital.).—Planing down the type.

Applegath, Augustus, a celebrated maker of printing-presses, was born in 1789 in England, and died there, at Dartford, February 9, 1871. He was a printer originally and began business for himself in 1812. His father was Augustus Joseph Applegath, a captain in the East India service. In 1816 Edward Cowper, his brother-in-law, took out a patent for printing with curved stereotype plates, and, according to an English account, machines constructed on this principle were successful for years. The invention consisted in "curving or bending stereotype plates and printing with the same." His method was to take a mold in plaster-of-paris from the blocks or types, and to cast therefrom a plate "in the usual method practiced by stereotype founders with the alloy used for printers' types or stereotype plates." The plate was heated and laid upon some soft surface face downwards, and the two were then passed under a cylinder, the degree of pressure employed producing the curve required. Such curved plates were afterwards fixed upon a cylinder by means of catches. This cylinder revolved under inking-rollers, which alternately ran on the naked cylinder and on the stereotype plates fixed on a part of it. Color was applied to these rollers from other rollers that distributed the ink to a large distributing-roller supplied by a vibrating-roller from a metal cylinder against which the color lay. After the stereotype plates had received the color they came in contact with the paper on the paper cylinder, which revolved in contact with and pressed against the plates. This machine was for continuous sheets or long sheets of paper-hanging. In company with Applegath, Cowper, in 1818, patented a method for distributing ink upon a flat distributing-table by means of rollers covered with leather, felt or composition, the distributing-rollers having an end motion. This was just before the time of the introduction of composition rollers into general use in England. At the same time the patent included the improvement for conveying the sheet of paper from one printing-cylinder to another by means of four conveying-drums, to which it was held by two sets of endless strings or tapes. With modifications this is still in use in England. In 1818 they made machines for the Bank of England to print six colors in perfect register, and these were employed for some time. Shortly after Applegath separated from Cowper, opened a new printing-office in London, the nucleus of the present office of the Messrs. Clowes, and began to make machines for newspaper printing. Their circulation was constantly increasing, but the means of supplying the printed sheets did not increase in the same ratio. He succeeded in making a press, known as a four feeder, for the *Times* in 1826, which turned out 5,500 an hour, but in 1846 Mr. Walter demanded one that should go still faster. The machine first mentioned is described by Savage as a combination of four presses in one, but the new one invented by Mr. Applegath cannot thus be classed. The types were made up and secured around a vertical cylinder, this form being adopted for more security. There were eight impression cylinders around the central one, and each cylinder had its separate feeder and taking-off apparatus. There was a certain resemblance to the Hoe type-revolving press, in which similar devices were shown at about the same time, but the position of the cylinders and the sheets was much more awkward. This machine was subsequently enlarged so that a theoretical speed of 20,000 an hour could be obtained, but it was superseded by a Hoe in 1859. In 1846 he devised a method for printing from rolls of paper, but he was not the first to put this theory into practice, having been anticipated both by Bullock and Walter. To him were due many improvements in the press, type-casting, embossing and silk printing. It is incontestable that he was the first who modified and made practicable the steam-machine for popular work, as the press of König was extremely complicated.



APPLEGATH'S VERTICAL MACHINE.

Appleton, Daniel, the founder of the present immense business of D. Appleton & Co., New York, was born in Haverhill, Mass., December 10, 1785. He was bred to the dry-goods business, and went to New York in that capacity in 1825. Shortly after, in company with Jonathan Leavitt, his brother-in-law, a bookbinder, he began bookselling. In 1831 he removed to the Clinton Hall building, at the south-west corner of Beekman and Nassau streets, his son, William H., being with him. They were very successful, having a fine knowledge of books and authors, and their business steadily increased, until only one other house existed in New York city of the same magnitude. In 1837 their London agency was opened, and the next year William Henry Appleton became a partner. Mr. Appleton died on March 27, 1849. The business was continued by three of his sons, William H., John Adams and Daniel Sydney. In its earlier years their place of business was at 200 Broadway, afterwards at 346, and then at 443, the old Society Library building. They removed from this to 72 Grand street, then to 549 Broadway, and are now at 3 Bond street. Junior members of the family have been admitted within a few years. Two of the sons are dead, leaving as the only survivor of the original family William H. Appleton. Those who are now members besides him are William Worthen, Daniel and Edward Dale Appleton. The latter is in charge of the printing-office and bookbindery, which is under the control of the Appleton Manufacturing Company, of which the members of the firm and the heads of departments are trustees. The printing-

Daniel Appleton

office and bindery in Brooklyn, N. Y., a very large one, is fitted with every convenience. This house has long been noted for its medical and scientific books and for its works of reference. The American Cyclopædia has been issued in two editions, the first beginning in 1858 and the second in 1872. The number of copies sold has been very great. Picturesque America was another great success. Of Webster's Spelling Book, which they still issue, they print a million copies a year.

Apprendista (Ital.).—An apprentice.

Apprenti, l' (Fr.).—The apprentice; apprentissage, apprenticeship.

Apprentice (from French apprendre, to learn).—One who is learning a trade. Before the minute division of labor and the establishment of factories, which began just before the American War of Independence, almost all of the manufactured articles of commerce and trade were made in little shops, consisting of a master, a journeyman or two and several apprentices. In these callings men could earn more money than by agriculture or seafaring, and places in them were eagerly sought for. Such customs extended to occupations to which we do not now attach the idea of apprenticeship, such as stationers and mercers. They afforded to boys generally their only opportunity of rising. The lads were not accepted without a premium, or some arrangement by which the father or guardian became responsible for a sum of money. The usual term was for seven years, or longer if the boy was taken before fourteen, and he and his guardian were obliged to enter into an agreement with a penalty clause, which was to be enforced in case of its violation. These customs extended to this country, with the exception of the premium. There is still living in New York a journeyman who served eight years and a half in that city. In England, as we learn from Johnson, the strictness of the agreement had been lessened by 1810. Masters then began taking apprentices who did not live with them, and even boys who had gained a certain proficiency, but had not yet filled their time. These became known in that country as turnovers, because in some cases they turned over their papers to another master. In the United States complaints were made by the New York Typographical Society as early as 1820 that employers were putting on too many boys. Yet the practice of having the boys live with the family still continued. James Harper, the oldest of the firm of Harper & Brothers, lodged and fed his apprentices after he began business, and even administered corporal punishment to them. The right of the master to do this was regarded as indisputable. But after 1836 indoor apprenticeship ceased to be the rule, and was unknown here twenty years later. At the same time the total number of those that were apprenticed was diminished. Probably in 1860 not one boy in thirty was bound. Later the custom was almost entirely given up. In country districts boys are, in rare instances, still apprenticed. If indentures are made out they are for short terms, generally for four or three years, but sometimes only for two. It is needless to say the trade could not be learned in this time, but owing to the bad habit which prevails by which book composition is not taught to a boy on a newspaper, and a job hand knows next to nothing about the two other subdivisions of typesetting, the amount of information gleaned during an apprenticeship is very little indeed. The common method now with boys in the country is for the employers to make a verbal agreement with them for a certain number of years, naming the remuneration that will be given. This varies from $30 or $40, with board, the first year, up to $100 or $150 the fifth year. By the week it is from $2.50 at the beginning to $6 or $7 at the end. The employer has no more control over the apprentice than he has over any other boy. In the cities there are hardly any boys who have made a definite agreement to stay a length of time. The system has virtually disappeared, and few employers care about hiring boys as compositors. When they do so the boys are known as two-thirders, because formerly they received two-thirds of the wages of the men. The downfall of the apprentice system may be traced to several sources. Masters had a different mode of life and did not like to dwell over their offices; their places had become large, and they could not devote that attention to the apprentices which was requisite if the latter were to derive much benefit from the association; great labor was entailed upon the mistresses in the way of cooking and in taking care of rooms; boys resented the indignities and hard work put upon them, much of this having no relation to the printing business, and ran away; magistrates would not punish, hence no discipline could be exercised, and the newspaper printers for many years set their faces against the employment of any apprentices on daily papers. There were few well-qualified workmen to teach, and the apprenticeship did not bring its fancied advantages. In recent years the printers' unions have generally forbidden employers from having more than one apprentice to ten or twelve journeymen. Whenever a strike came off the union would urge the oldest and largest of the boys to join them, which they generally did. These various causes have combined to put an end to the former system of learning the trade. There is still a sufficient supply of boys, however. In the city they enter as feeders upon a Gordon press, or as errand boys, gradually pick up some knowledge, and leave one situation for another, urged by higher pay, until the young men think they ought to get journeyman's wages. In the country the supply is inexhaustible. Boys work a few months or a few years, go to the cities, and after being in them long enough to acquire their trade over again become passable workmen.

In view of these things it becomes needless to lay special stress upon what the older writers on typography have said about an apprentice. He should be in good health and have good eyesight; his education should be far enough advanced to be able to answer the ordinary questions in grammar, history and geography; he should have a familiarity with writing, and know how to spell. The study of books on typography ought to be interesting to him, and he should, as far as possible, endeavor to learn the reasons why certain operations are performed as they are. The cup must be avoided, and the apprentice should devote his leisure hours to reading books of value. It is not so much by what is done, but by what he knows how to do, that a man attains success. If the boy learns his trade in a small office he ought as soon as possible after his time is up to labor in a larger one, with a different class of work, so that he may really become an accomplished journeyman.

In England the usual term of apprenticeship is seven years. The boy is no longer taught the whole trade, but is only an apprentice to one branch, except in small country offices. An apprenticeship expires at twenty-one years of age, no matter how long the boy may have been bound for. In London indoor apprentices are no longer taken, the regulations of indenture having recently been altered. The Society, or printers' union, will admit no one who has not completed his time.

The following is the form of apprenticeship agreement used by Quantin et Cie., of Paris, and similar agreements are used everywhere throughout France, although the wording may be different:

Article 1.—M. .... has requested MM. Quantin et Cie., who have agreed thereto, to admit .... as an apprentice compositor on the conditions hereinafter specified, and to which M. .... has given his complete adherence.

Art. 2.—The term of apprenticeship is to be four consecutive years, to commence from this .... day of ...., 18.... M. .... formally engages to leave .... in the establishment during the above-named period.

Art. 3.—The young .... is compelled to submit with zeal and docility to the tasks which will be given to him, and he is to conform strictly to the rules and customs of the house.

Art. 4.—M. Quantin requests no premium from M. ....

for the attention and professional education given to the apprentice; but M. .... engages to contribute by his personal efforts to maintain the pupil in the assiduous habits and good conduct demanded of him in the office.

Art. 5.—The apprentice should be punctual in his attendance at business at 8 A. M., and must always appear tidy and clean. Any infraction of this regulation without a plausible motive being assigned will be punished with a fine. One hour will be allowed him for *déjeûner*, and he will leave the office at 7 P. M.

Art. 6.—Every month a report of the apprentice's work and conduct, delivered by the manager of the office, and signed by M. Quantin, will be sent to the parents, who will thus be able to follow the progress of the boy. This report must be returned the following day to the manager, accompanied by the signature of the parents.

Art. 7.—In case of enforced absence by sickness or any other cause, M. .... engages to communicate immediately in writing with the manager of the office. If the complaint should cause a prolonged absence the apprentice will be required to give this time at the end of his apprenticeship.

Art. 8.—After the first six months, if the boy has conducted himself well, and has given satisfactory proof of his zeal for the work, he will receive a remuneration of a sou an hour, which may be increased successively to two, three, four and five sous [five cents], according to his progress as certified by the manager of the office. If, on the contrary, the conduct of the boy be unsatisfactory and open to complaint, the gratuitous period may be prolonged, and may even be followed by dismissal. According to the requirements of the work and at the will of the manager the fixed wages may be changed, regularly or suddenly, to a piece-work scale, at the rate of a fourth, third or half of the scale for journeymen, according to whether the apprentice has served one, two or three years of his time.

Art. 9.—A stoppage of one-fifth will be made from the boy's wages. If he has always faithfully fulfilled his engagements this accumulated capital will be returned to him at the end of his apprenticeship, but if he has not done so it will be forfeited to M. Quantin.

Art. 10.—If at any period whatever of his apprenticeship the boy, by reason of violation of the clauses of the present contract, insubordination, misconduct, or any other sufficient cause, and of which M. Quantin alone will be the judge, necessitates his dismissal, he will thereby lose all claim to the benefit of the preceding articles, as well as to the stoppages which have been made from him, without the parents being able to make any objection thereto. In such a case this contract will be void, and the apprentice will be deprived of any certificate whatever showing his progress in the establishment.

Art. 11.—Should the apprentice leave the office before the time fixed by the present agreement, either of his own accord or through his parents, M. Quantin will avail himself of all his rights before the proper tribunal.

Art. 12.—If, at the end of his apprenticeship, it is found that the apprentice has shown sufficient zeal, good conduct and aptitude he will be given employment and admitted as a journeyman in the house. A silver medal will likewise be given to him *en souvenir* of his apprenticeship.

Art. 13.—If, from any unforeseen cause, the trial made by M. Quantin does not answer to his expectations, he reserves to himself the absolute right to close this office whenever he may think proper. In that event he will reimburse to each deserving apprentice the amount of the stoppages made from him.

[Here follow the date and signatures of the master and the boy's parents or guardian.]

In the office of Chaix et Cie., one of the largest in the whole world, the apprentices are looked after very carefully, and in addition a technical school is kept up, which will be described under TECHNICAL INSTRUCTION. The boys are admitted into the establishment on trial at the age of thirteen. They must be provided with a certificate of elementary instruction in accordance with the law, and must undergo an examination to test the extent of their education; they are then examined by the doctor of the house to ascertain if they are in good health, whether they have been vaccinated or are suffering from any infirmity which would be likely to render them unfit for their business. The apprentices are bound for four years. After the first six months of trial those engaged as compositors, engravers or lithographers are paid at the rate of ten cents a day; during their second year they receive twenty cents a day; the third year thirty-one cents; the first half of the fourth year forty cents, and fifty cents during the last six months. Those employed in the pressroom are paid the first three months (the trial period) fifteen cents a day; after three months, twenty cents; six months, twenty-five; nine months, thirty, and so on for every three months to the end of their apprenticeship. The apprentices who are learning the business of a compositor work in a room by themselves under the guidance of a competent workman, while the superintendence of those in the pressroom is in the hands of the pressmen and the foreman of the pressroom. The practical education of those in the composing-room is graduated according to their respective ages and the proficiency they display. During the first year they learn to pick up the characters, to space and justify the lines and to distribute the type, and are made acquainted with the different types used in composition; in the second and third years they are taught the art of composing title-pages, tables and the correction of authors' proofs; while in the fourth year they are exercised in making up pages, imposing sheets and in general supervision of the work of the younger apprentices. After having served three years and a half they are placed under clickers of companionships in order to obtain a thorough knowledge of the ordinary routine of the workroom.

To encourage the boys in application several devices are used. Ornamental tokens are distributed, bearing on one side the name and style of the firm, and on the reverse an excellent moral borrowed from Franklin, which runs thus: "If anyone tells you that you can enrich yourself in any other way than by labor and economy, don't listen to him; he is a poisoner." Marks are awarded for good conduct and work, which are added up at the end of the month, and the total determines the position of the apprentice on a tablet of honor placed in the workroom. Prizes are distributed annually, comprising books, composing-sticks, inkstands, purses or other suitable rewards. Little instructive and moral books and tickets for theatres and concerts are frequently given out. Monitors (known by the military title of sergents) are appointed every month from the most deserving, and their duty is to exact order and to exercise supervision, for which service they receive at their option either a dozen photographs of themselves or a sum of five francs. A library of 700 volumes is furnished. There is a monthly examination of the apprentices by the doctor of the establishment. Simple medicines are furnished gratuitously by the house in the event of illness. Each apprentice contributes about fifteen cents a month to a mutual aid society. He thus becomes entitled to have the attendance of the doctor at his home and a sum of six francs a week for six months. In the event of the boy's death his relatives receive the sum of $10. There is a savings-bank, insurance against accidents, life insurance, a bonus according to the profits of the house that year, and a fund for the superannuated. If he remains with the establishment for forty years, or from the beginning of his apprenticeship till he is fifty-five, he will receive from that time a life annuity of about $80 a year.

The Philadelphia Typographical Union, at a meeting in September, 1868, made the following regulations respecting apprentices, which probably embodies all that can or will be done upon this subject by the unions, as a nearer approach to the old system of apprenticeship is maintained in that city than anywhere else:

1. All boys entering a printing-office with the intention of learning the business shall be held by indenture or written contract.

2. Every boy shall be held by indenture or written contract for a period of not less than four years.

3. The number of apprentices in an office shall not exceed the proportion of one to every five journeymen regularly employed, the average to be ascertained from the books of the office—say for one year.

4. All apprentices in book offices shall be paid by the piece, at journeyman's wages, and fixed sums (as may be agreed upon by the contracting parties) shall be deducted by the employer as compensation for labor and expense incurred in instructing them in the art.

5. When a boy shall have contracted with an employer to serve a certain term of years he shall on no pretense whatever leave said employer and contract with another without the full and free consent of said first employer; provided, that such change may be made in consequence of the death or relinquishment of business by first employer.

6. Job Apprentices.—Job-work being necessarily required to be done by the week, the apprentice shall receive such compen-

sation for his services as his ability shall command. In all other respects he shall be governed by the same rules as apply to boys on piece-work.

Of late years the matter has been much discussed by the unions and by the International Union, always with the proviso that the number of apprentices must be very small. The United Typothetæ, at its session in 1890, adopted a recommendation that the term should be five years, six months on probation. The boy must have a fair English education, and he is to be put at work with a distinct understanding that he is to learn the business thoroughly, from beginning to end.

Aquatint, Aquatinta (Ital.).—Literally, stained or dyed water. A peculiar style of etching on copper or steel, in imitation of drawings in sepia or India ink. The plate is covered with a ground of black resin and spirits of wine, to which the design is transferred from the paper upon which it has been traced. The high lights are then stopped out, and the various gradations of tint are produced by the action of nitric acid and water.

Arabic.—The language used in Arabia, the spoken and written ecclesiastical language of Mahometanism, and one of the most widely spread tongues in the East. The first book in Arabic is supposed to be one issued at Fano, in Italy, in 1514. The Koran was printed in 1518, at Venice. No printers in this country, except those employed on theological work, have any of this type, but as there may sometimes be a necessity for it in lexicons or vocabularies we give the alphabet and note a few of the peculiarities. Arabic is read from left to right. The method of composing it is upside down, and after the points are placed at the top of the letters the line is turned in the composing-stick. The alphabet consists of twenty-eight letters, which are somewhat similar to the ancient Kufic, in which characters the first copies of the Koran were written. The present Arabic characters were formed by Ebn Moklah, a learned Arabian, who lived about three hundred years after Mahomet. The early letters are supposed to be of a very high antiquity. Seven different styles of writing are used by the Arabs at the present day. The common form is called "neshki," the order being peculiar to themselves. There are four forms to the letters —unconnected, joined to the preceding letter, joined to the following letter, and joined to both the preceding and following. A, D, Dz, R, Z, W, and Lam-Elif (La), a supplementary or twenty-ninth letter, have only two forms each, the forms when joined to the preceding and following letters and joined to the following letter being omitted. This makes, therefore, twenty-two letters with four forms, and seven with two each, or ninety-eight in all. It should be noted that there are no capitals, small capitals, nor Italics; that the punctuation marks are not the same as those we employ, and that vowels are sometimes justified under as well as above the characters. It is, therefore, necessary in this sort of work to follow copy. Any editor or author of a book of which Arabic is to be a principal part can provide the compositor with a grammar, from which he can learn some elementary principles. Further than this he cannot be expected to go. Arabics must be provided from English, German and French foundries, as American foundries do not make them.

The first twenty-two letters of the alphabet are the same and follow the same rule as those of the Hebrews and Syrians. The other six were probably added afterwards. The last character, Lam-Elif or La, is not a letter of itself, but only a combination. Many letters differ only from the others by the addition of diacritical points. There are only three signs to indicate all the vowels. The first is like an acute accent (´), the second the acute accent below the word, and the third like a small figure 9 or a comma over the consonant, with which it forms an articulate sound. There are several minute orthographical signs, differing from any characters in an American printing-office, and which must be obtained with the type or omitted. There are no true marks of punctuation. The method of indicating the commencement of a new subject is to make a new paragraph. The end of a subject is shown by one or three little semicircles or a

Unconnected.	Joined to the preceding letter only.	Joined to the preceding and following letter.	Joined to the following letter only.	Power of the letter.
ا	ـا	....	....	A
ب	ـب	ـبـ	بـ	B
ت	ـت	ـتـ	تـ	T
ث	ـث	ـثـ	ثـ	Ts
ج	ـج	ـجـ	جـ	Dj
ح	ـح	ـحـ	حـ	H
خ	ـخ	ـخـ	خـ	Kh
د	ـد	....	....	D
ذ	ـذ	....	....	Dz
ر	ـر	....	....	R
ز	ـز	....	....	Z
س	ـس	ـسـ	سـ	S.
ش	ـش	ـشـ	شـ	Sch
ص	ـص	ـصـ	صـ	S.
ض	ـض	ـضـ	ضـ	Dh
ط	ـط	ـطـ	طـ	Th
ظ	ـظ	ـظـ	ظـ	Dh
ع	ـع	ـعـ	عـ	'A
غ	ـغ	ـغـ	غـ	Gh
ف	ـف	ـفـ	فـ	F
ق	ـق	ـقـ	قـ	K
ك	ـك	ـكـ	كـ	C
ل	ـل	ـلـ	لـ	L
م	ـم	ـمـ	مـ	M
ن	ـن	ـنـ	نـ	N
ه	ـه	ـهـ	هـ	Hé
و	ـو	....	....	W
ى	ـى	ـيـ	يـ	Y
لا	ـلا	....	....	La

ARABIC ALPHABET.

star, or by writing in red the word which commences a new article. Red ink is much used in copying the Koran to indicate rhetorical pauses. Letters of their alphabet are used to indicate figures, but this system is not that which we know as the Arabic numeration. The powers of these characters are not varied by being in a new location. They, however, know the system we follow and call it the Indian cipher.

Arabic Numerals.—The figures used in ordinary computation, thus named because they are supposed to come from Arabia, and in distinction from Roman numerals, which are letters with other powers. There are ten of them, the 1 and 0 being more used than any of the rest. They are usually cast on en bodies. A change at the beginning of this century made all the figures ascending letters, whereas before several of them were descending characters. The old style are said to be the easiest to read.

Arab Press.—A small jobbing-press, imitated in England from an American model.

Arbeitgeber (equivalent to work-giver) and **Arbeitnehmer** (equivalent to work-taker) are new terms in Germany, used instead of master and journeyman.

Arbitrary Signs.—Characters used in writing or printing to express some word or idea more compendiously or clearly than can be done otherwise. There are multitudes of them. See under Algebra, Astronomical Signs, Chemistry and Mathematics.

Arbitration.—Arbitration has long been known and practised. Among the Romans an officer entitled an arbiter was charged with duties similar to that of an arbitrator now, although he was also possessed of some judicial powers. It is properly called arbitration when each of the parties submits a question in dispute to the decision of a disinterested person. It may be left orally or in writing, and in either case the award, when properly made, should be binding upon each of the parties. The submission is in the nature of a commission by both to the arbitrators to determine the subject in dispute. If either revokes this authority before the award is made it will not be binding upon the one so revoking. But if the submission were by bond or covenant, or in writing, and in some other cases if it were merely oral, the other party will be entitled to damages against the one so revoking for the breach of his agreement to submit the matter in dispute to arbitration. General agreements to submit disputes that may arise, such as those contained in policies of insurance, are not binding by the laws of the United States nor by those of England. Crimes cannot be made the subjects of adjustment and composition by arbitration, for the public is here one party; but the personal injuries and pecuniary damage resulting from crimes and breaches of the peace may be made subjects of reference. If it appears that the arbitrator was interested, and his interest was unknown to one of the parties, or that he was bribed, or that any other strong objection lay against his acting as arbitrator, exception may be made to the award on that account. Arbitration has lately grown very popular with writers upon economical subjects, and also with labor leaders, but with the latter in a modified form. Disputes frequently arise between employers and their help in which the latter demand something more than they have previously received. In case that demand is refused they then ask for arbitrators. They cannot be worse off than they were before, while they may receive all that was applied for. A false kind of arbitration is for the employees and employers each to take a certain number of names from among themselves, and call them arbitrators. They are not so, because they lack impartiality. Those who should discharge this office are men not connected with either party, preferably judges of a court or professional men. Arbitration frequently falls through from the unwillingness of one of the parties to abide by it. In 1856 the master printers of London and the journeymen appointed each two persons to serve on an arbitration committee, with a fifth person, chosen by them, who should be a barrister. After hearing some cases the committee was broken up, as the journeymen had lost one case out of three and withdrew their representatives. Within its own sphere, the determination of prices or damages, arbitration may be of great value. It cannot be applied rightfully to such questions as the discharge of men or to the fulfillment or non-fulfillment of a promise. There is a court of arbitration in New York city which very rarely sits, as no provision has been made by law for the payment of a judge. The State has three commissioners of arbitration, who have rendered valuable service since they began. It was established by act of the Legislature, passed on May 18, 1886. It consists of three persons appointed by the Governor and Senate for the term of three years. The act requires that one arbitrator be selected from the party which at the last general election cast the greatest number of votes for Governor of the State, and one from the party which cast the next greatest number of votes for the same officer, the third to be selected from a bona-fide labor organization of the State. The State Board of Mediation and Arbitration is authorized to appoint a clerk or secretary, who is empowered, under the direction of the board, to issue subpœnas, to administer oaths in all cases before the board, and to call for and examine books, papers and documents of any parties to a controversy, and he is authorized to enforce their production in the same manner as courts of record, or the judges thereof, in the State. The arbitrators and clerk are required to take the constitutional oath of office before entering upon the performance of their duties. It is made the duty of the State Board of Mediation and Arbitration to hear and consider appeals from the decisions of the local boards, and whenever a strike or lock-out shall occur or is seriously threatened in any part of the State and shall come to the knowledge of the board, it shall be its duty to proceed, as soon as practicable, to the locality of such strike or lock-out and put itself in communication with the parties to the controversy, and endeavor by mediation to effect an amicable settlement of the controversy. Any two of the arbitrators constitute a quorum for the transaction of business, and may hold meetings at any time or place within the State. The board is required to report to the Legislature annually, and is directed to include therein such statements, facts and explanations as will disclose the actual working of the board, and such suggestions as to legislation as may seem to them conducive to harmonizing the relations of and disputes between employers and the wage-earning masses, and the improvement of the present system of production.

The New York Typothetæ has made provision for the submission of disputes between two members, or between a member or members and their employees, to arbitration, and the Electrotypers' Association of New York has found a committee on this subject very useful.

Arbor.—An upright shaft or pillar in the Stanhope and other hand-presses, transmitting motion from the bar upwards.

Arbor Head.—The short lever at the top of the arbor which is turned by the motion of the bar below, and in turn transmits the power to the top of the screw.

Archaism.—An antiquated word or phrase. Proofreaders cannot be too much cautioned to let such words alone. Language is continually altering, and we have no right to say that a word is not English because in our view it is no longer used. Tennyson owes much of his flavor to the archaic words he has revived. The principal repository for such words is Halliwell's Dictionary of Provincial and Obsolete Words, but the new

Century Dictionary, the new English Dictionary edited by Dr. Murray, and the revised editions of Worcester and Webster abound with them.

Arching of a form is when, by being locked up too tight or from any other reason, the type in its centre rises from the stone, giving a slight curvature to the pages. It is remedied by planing down or by slightly loosening the quoins and then planing down, when they may again be tightened.

Areopagitica.—A book issued by John Milton in 1644 in favor of unlicensed printing. The press was then under strict control, and the appeal that the poet made for liberty has been the foundation of many subsequent arguments. One passage runs thus:

"Debtors and delinquents walk about without a keeper; but inoffensive books must not stir forth without a visible jailer in their title; nor is it to the common people less than a reproach: for if we dare not trust them with an English pamphlet, what do we but censure them for a giddy, vicious and ungrounded people, in such a sick and weak state of faith and discretion as to be able to take nothing except through the glister-pipe of a licenser!"

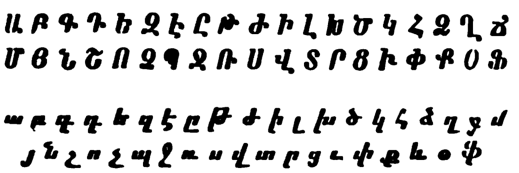
Arizona.—Printing has been done here since 1863, the Arizona Sentinel having been published at Yuma since 1863. Seventeen newspapers were published in this Territory in 1880, and twenty-six in 1890.

Arkansas.—The printing-press was established in Arkansas in 1819 at Arkansas Post. By the last census there were six dailies and 111 other periodicals. The chief printing-offices are at Little Rock.

Arkrographie.—A name given by its inventor, Schwenberg, to his method of etching in relief.

Arm.—A connecting-rod joining two working parts of a press.

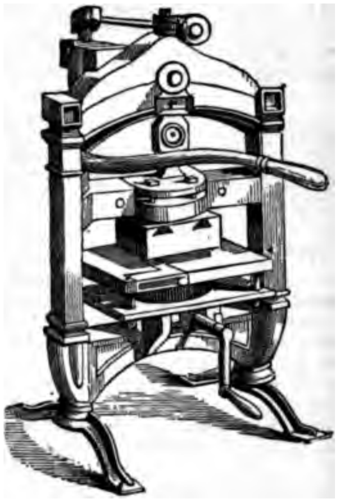
Armenian.—The first printing in Armenian was at the Vatican in Rome in 1591. It has not become a language in which there are many books issued, but it is the tongue of a very enterprising commercial people, with peculiar religious tenets, and in dictionaries or lexicons it is used sufficiently to justify a small font being purchased for large offices. The Armenians had no characters peculiar to themselves until the fourth century, but used indifferently those of the Syrians, the Persians, the Arabians and the Greeks. The present alphabet contains thirty-eight letters, which it is said were invented by Miesrob in the fourth century. Others say that St. Chrysostom was the author. Although the Armenian characters are generally supposed to have been derived from the Greek, their forms are very different, and their number exceeds those in the Greek alphabet by more than one-third. They have four kinds of writing—flourished, writing with iron or a stylus, round and running hand. The latter is the more common kind. They do not require accents to be justified over them. The a and d are very closely alike, as are the ch and t, the je and e, the ss and k, the je and r, the sg and z, the i and hh, the l, sc and cc, the zz and n, and the rr, s and u. Type must be procured from English or German foundries. Annexed is the alphabet:



ARMENIAN ALPHABET.

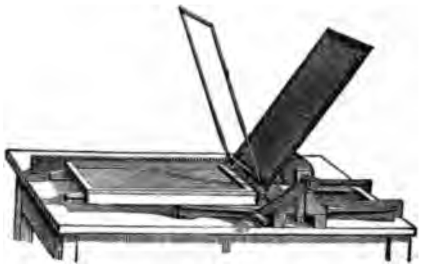
Armbruster.—The name of two Germans who carried on printing in Philadelphia in the last century. Godhart went to that city from Mannheim in the year 1743. He did job-printing, and after a time began a German newspaper, Die Zeitung. In 1752 it was carried on by Anthony Armbruster, his brother. Godhart then returned to Europe, where he died. The printing of both these brothers was for a Society for Promoting Religious Knowledge among the German Emigrants in Pennsylvania. Crellius had preceded them. Anthony Armbruster in 1754 entered into a partnership with Benjamin Franklin, which continued till 1758. He failed in business while Franklin was out of the country, and a settlement of affairs did not take place until his return in 1762. They were no longer friends, and shortly after Armbruster published a caricature of Franklin. He failed several times in business after this, and after his last failure worked as a journeyman. He was three times married. He died in Germantown in July, 1796, aged seventy-nine.

Arming-Press.—A press used to stamp a block or centrepiece upon the sides of books. It was thus called because it was commonly used for improving armorial bearings and monograms. Blocking-presses now generally take its place in England, and embossing-machines, the same device under another name, in the United States.



ARMING-PRESS.

Army Press.—A small press made by the Cincinnati Type-Foundry, much used in the Civil War. It has a cylinder by the rotation of which the bed is moved and the impression given simultaneously. Papers are worked, folded and turned, taking four impressions to complete each paper.



ARMY PRESS.

Art.—Among printers their calling is usually spoken of as "the art," or the "art preservative of all arts."

Artist's Proof.—The original proof or proofs made before an engraving or etching is submitted to the public. It is sometimes used inaccurately for impressions made on large paper, no matter at what time.

Artotypes.—A method of making gelatine plates from photographs, which are printed from in a similar way to lithographs. It does not differ much from the Albertype. A mixture of albumen and soluble glass is used for a foundation film, the sensitive coating being afterwards placed upon it. As this film does not require to be hardened by light, opaque metallic plates may be substituted for the plate-glass of the Albertype. It was invented by Obernetter, of Munich, in 1878. See PROCESS PRINTING.

Asbestos.—A fibrous mineral which can be woven and spun, and which resists the action of fire. Cloth has been made of it, as well as paper.

Ascender.—An ascending letter is one in which some of the strokes ascend higher than the top of the m or n. Thus b, d, f, h, i, j, k, l and t are ascending letters, as are all the capitals. The t, however, does not reach the top. In actual use only about one-fifth of the letters in a paragraph are ascenders. It has been proposed at times to shorten these letters, so that they would be no longer than the m or w, and also to cut off the descending letters. This would enable one-third as many more letters to be placed in a single inch, up and down a column, if the shoulder was shaved off very close, but the proposal has not met with favor from the judicious printer nor from the oculist. To read easily much blank space is needed, and the characters must be as unlike each other as possible. Thus the word "kale" is more readable than "cane," and "through" than "even." In the first word of each of this pair of examples there is a variety, while in the latter there is a dead level, and as the reader who has advanced beyond the grade of a school-boy does not spell his words, but takes in each of them as a single compound mark, he fails to distinguish the latter as quickly as he does the former. The degree of legibility that type would have without ascending or descending letters may be seen in the margin, small capitals being used where the letters would either fall or rise, and a period answering for a punctuation mark. The use of small capitals modified has been favored by the advocates of this theory, but the reader can judge how the matter will look. The upper and lower shoulders are cut away.

HAVE THE MOLD CAREFULLY CLEANED AND OILED ON THE INSIDE. SET IT UPRIGHT. WITH THE CORE IN ITS PLACE IN THE CENTRE. THEN POUR IN THE COMPOSITION HOT FROM THE KETTLE CAREFULLY UPON THE END OF THE CORE. SO AS TO RUN DOWN THE CORE.

TYPE WITHOUT SHOULDER.
(See Descender.)

Ashmead, Isaac, a leading printer of Philadelphia, began business about 1821, in Lodge alley. He introduced the Treadwell press in that city in 1827, and was thus the first power-printer there. Horses were first used to furnish the motive-power, but after the number of presses had increased to eight, being in part of medium size and of medium and a half, he put in a four horse-power steam-engine. These presses were afterwards exchanged for a better make. Mr. Ashmead's business continued in his hands for many years, and was prosperous. He was a very prominent man in Sunday-school work. He died in March, 1870, in his eightieth year.

Aspirate.—A mark placed over Greek letters to indicate that they should be pronounced as if an h were prefixed.

Ass.—Sometimes by way of a joke, and sometimes for the purpose of irritating, compositors are called asses by the pressmen. In Moxon's time they were called galley-slaves.—*Savage.* Unused in America.

Assembler (Ger.).—To take off (sheets). The word is a French one, and means to bring together.

Assistant.—A compositor on a London daily newspaper who does not work regularly for the whole day, but is called in as he is wanted.

Associated Press.—A number of newspapers associated together for the collection of news. The original organization bearing this name was in New York city, but there are Associated Presses in other parts of the State, New England, Pennsylvania, and, in fact, throughout the whole country. The New York association, which is the best known of all, is composed of the Tribune, Times, Herald, World, Mail and Express, Sun and Journal of Commerce, and was organized in 1849. For twenty or twenty-five years prior to this it had been the habit of daily newspapers to send out a boat to meet incoming vessels from which they could gather news, foreign intelligence then being considered the most valuable of all. After railroads were in operation newspapers used to race to obtain news from other quarters, and sometimes compositors were sent by steamboat with cases of type to places where speeches were to be made, so that the report might be entirely set by the time the boat reached New York. Such rivalry was very expensive, and in the year indicated an agreement was entered into by seven newspapers by which news should be collected for the whole of them, and given to each in manifold. As most news was of a routine character there was no great need of rivalry about it, and the arrangement then made has lasted until to-day. Their news is also sold to the other organizations of like character, the New York association furnishing the general news of the country, New York city news and cable dispatches. All prominent newspapers in the Union supplement these dispatches with special ones. The right to obtain dispatches in New York has been denied to several newspapers that have desired to obtain them, and the present New York Sun was bought by Mr. Dana and his associates on purpose to get Associated Press news, as they could obtain it in no other way. William Henry Smith is the present agent, his predecessors having been J. W. Simonton and D. H. Craig.

Asterisco (Ital.).—A star or asterisk.

Asterisk or Star, a mark, *, used to call attention to a note below, and for several other purposes. It is the first reference mark, and is followed by the dagger, †. It ought not to be excessively large, not wider than an en quadrat, and to show the star unmistakably. Sometimes after all the reference marks have been used it becomes necessary to go over the series again. In this case two stars are used, and in a third three stars. A star may either follow or precede the words to which it relates. The logical method would be to have it follow them, and for the sake of clearness and to have the reference marks line with each other it ought to begin the note. In this case a thin space is used to bear it off, and this is generally done also in the text. Sometimes a note or explanatory sentence or essay is printed which does not relate to any particular word in the body, but bears upon the subject in general. This is often marked with three stars or five stars, as *** or *****. An omitted letter, word or words, in former times used frequently to be denoted by stars. Thus in the reign of George III. it was common to speak of Lord Shelburne as L** Sh***e, Fox as F** and Burke as B***e. Sometimes these omissions were very extensive. A line might show a considerable hiatus, or it might indicate matter which would be dangerous to print, as the libel laws were then very severe. In one place in Tristram Shandy half a page is filled with asterisks. They are now much less used, and periods, to indicate abbreviations, and several periods or leaders, to indicate a suppression, are now thought much neater. Dashes are frequently employed for the same purpose. This character is sometimes used in columns of words or figures to indicate different relation, as, for instance, in a division in Congress, when the vote is printed half measure, a star may be placed against the Republicans, so that they can be easily distinguished from the Democrats. In this case the words line and the stars project wherever they occur, and have no thin spaces between them and the matter. A star indicates paid in newspapers, when affixed to an advertisement or reading notice. It indicates in signatures in bookwork the inset. The first or main signature may be B, while the inset to the same sheet is B*. In colloquial language in a printing-office this mark is always called a star, and

not an asterisk, which signifies little star. For binders' convenience a star is placed at the bottom of pages which have been printed to supply the places of others which have been cancelled.

Asterism, one or more asterisks or stars, used alone or in connection with letters, instead of a name; as S***, Lady **, *⁎* or ⁎*⁎.

Asteroids.—The small planets, Vesta, Juno, Ceres and Pallas, situated between Mars and Jupiter, first discovered about the beginning of this century. Since that time more than a hundred others have been detected, and they are so numerous that they are generally indicated by figures within a circle, thus: ⑪.

Astronomical Characters.—These are more frequently used in almanacs and works of a pseudo-astronomical character than in books and treatises upon astronomy. They consist first of the twelve zodiacal constellations, which are as follows:

♈	Aries.
♉	Taurus.
♊	Gemini.
♋	Cancer.
♌	Leo.
♍	Virgo.
♎	Libra.
♏	Scorpio.
♐	Sagittarius.
♑	Capricorn.
♒	Aquarius.
♓	Pisces.

The planets, which term once included the sun and moon, were originally seven in number, but since the beginning of the century two beyond the others have been discovered, and a great number between Mars and Jupiter. They are thus shown:

☉	The Sun.
♄	Saturn.
♃	Jupiter.
♂	Mars.
⊕	The Earth.
♀	Venus.
☿	Mercury.
●	The Moon.
⚶	Vesta.
⚳	Ceres.
⚴	Pallas.
⚵	Juno.
⚘	Flora.
⧗	Hebe.
Φ	Parthenope.
🕊	Irene.
◓	Iris.
♠	Metis.
♆	Neptune.
♅	Georgium Sidus.
⚖	Astræa.
✡	Clio.

To the seven original signs were added those of the two exterior planets, Neptune and Herschel, or the Georgium Sidus. The first of the asteroids which were discovered were Vesta, Ceres, Juno and Pallas. No other was found until 1845, but since that time nearly two a year have been discovered. They have all been named by the finders, but since they numbered twenty or thirty the most common plan of naming them has been by putting figures in a circle, each asteroid having a number: Ceres is 1, Pallas 2, Juno 3, Vesta 4, Astræa 5 and Hebe 6.

Under the word aspects are usually enumerated the arbitrary marks used in almanacs. They consist of the

●	New Moon.
◐	First Quarter.
⊛	Full Moon.
◑	Last Quarter.
☊	Dragon's Head, or Ascending Node.
☋	Dragon's Tail, or Descending Node.
☌	Conjunction (in the same degree).
☍	Opposition, 180°.
△	Trigonus, or Trine, 120°.
□	Quadril, 90°.
☉	Sun.
⚹	Sextile, 60°.

These marks are cast on all bodies, from nonpareil to small pica, inclusive.

Atkyns, Richard, who will be chiefly remembered for the active part he took in declaring printing in England to have been first exercised in Oxford, was of a respectable family in Gloucestershire, being born there in 1615. He was educated at Oxford, took sides with the king against Parliament, suffered much for his loyalty, and published his Origin and Growth of Printing in England in 1664, in quarto. He died in the Marshalsea, where he was confined for debt, and was buried at the expense of his relative, Sir Robert Atkyns. It is believed that the extract from the records of Lambeth Palace he cited never really existed, and that political reasons induced him to fabricate it.

Atlanta, an important city in Georgia, has two dailies and thirty-four other periodicals, and a large number of printing-offices. Printing was practiced there as early as 1819.

Atlas.—1. A book containing maps, generally of considerable size. The maps are usually executed on copper-plates, as if they require to be altered it can be much more easily done upon this metal than upon any other. 2. A size of writing or drawing paper, 33 by 26 inches. It derives this name from its employment in the printing of atlases, which require large pages.

Atramentum (Lat.).—Ink.

Aubeldruck (Ger.).—Aubeltype, a process invented by Aubel, in Lindenhöhe, near Cologne, Germany, by which photographic pictures can, in a few hours, be transformed into printing-plates as hard as steel and at a moderate cost.

Auer, Alois, director of the Imperial and Royal Printing-Office at Vienna, was born at Wels, in Upper Austria, on May 11, 1813. He entered a printing-office in 1825, and in his twenty-fourth year published both a French and an Italian grammar. About 1837 he became the director of the National Printing-Office, taking in the meanwhile interest in many other subjects. Nature-printing is claimed as one of his inventions, and he also made very early use of endless rolls of paper. He received during his life many decorations. His death occurred on July 10, 1869.

Aufbinden (Ger.).—To untie or to tie.

Aufdingen (Ger.).—To bind (to a master).

Auflage, die (Ger.).—The edition, the impression.

Aufschlagen eine Presse oder Machine (Ger.).—To put up a press or machine.

Aufschliessen (Ger.).—To unlock.

Auftragen [Farbe] (Ger.).—To carry color.

Augusta, a city in Georgia, has two dailies and five other newspapers. Printing began there in 1785, the Augusta Chronicle being published in that year.

Augusta, Me., is a very important printing and publishing centre. The volume of work done there probably exceeds that of any other town of the same size in the Union. Printing began there in 1794.

Ausdrucken (Ger.).—To finish printing.

Ausdrucken im Sats (Ger.).—To drive out (in composition).

Ausgabe (Ger.).—Edition in a less restricted sense than Auflage. A neue Ausgabe may be only a Titel Ausgabe or Titelabdruck, a new title of an old book, which is not infrequently bestowed when a book does not sell well. The erste Auflage remains at its fixed price; the neue Ausgabe has a prix à discrétion.—*Caspar.*

Ausgabe (Ger.).—The edition, the impression.

Ausheben aus dem Winkelhaken (Ger.).—To empty the stick.

Ausheben die Form (Ger.).—To lift the form.

Auslassen im Sats (Ger.).—To leave out; an out.

Ausschiessbrett (Ger.).—A letter-board, a distributing-board.

Ausschiessen (Ger.).—To impose.

Ausschliessen (Ger.).—To justify.

Ausschliessungen (Ger.).—Spaces and quadrats used for justifying and spacing out.

Ausschneiden [the frisket] (Ger.).—To cut out the frisket.

Aussetzen einen Bogen (Ger.).—To complete the composition for a sheet.

Ausstattung (Ger.).—The "get-up," paper, print and binding; Ausstattung im orient. Geschmack, got up in the Oriental manner.—*Caspar.*

Ausstreichen der Farbe (Ger.).—To bray out the ink; that is, to take the ink as it first comes from the keg and partly distribute it with a brayer.

Australasia.—In the islands of Australia, New Zealand and Tasmania there are nearly 700 newspapers. There are 178 booksellers and stationers in New South Wales, 257 in Victoria, 42 in South Australia, 84 in Queensland, 10 in Western Australia, 21 in Tasmania and 207 in New Zealand. Book and commercial printing is largely carried on in Melbourne, Sydney, Brisbane and Dunedin.

Auszeichnen im Manuskript (Ger.).—To mark out in copy.

Author, from the Latin auctor, the maker of a poem, book or other literary composition. It is used in many other senses, however, than literary authorship. In this it is somewhat restricted. We do not apply the term author to one whose writing is done for newspapers, unless it is of a character that has no necessary connection with journalism, nor is it used except by hyperbole for those who compile facts or statistics which are afterwards published in book form. The latter are compilers. The quality of being an author is not denied to them when their work is original in its treatment, or distinguished by more than an ordinary command of the matter. The Authors' Club of New York admits no one who has not written a literary work. Authorship has not long been followed in the United States. Franklin and a few others wrote essays and books before the Revolution, but this was not their principal occupation. It is supposed that Thomas Paine, who came hither from England just before the outbreak of that conflict, was the first person who ever made his living here by his pen. He prepared for Congress pamphlets and papers designed to inform the Americans upon the questions at issue, and was paid for them. Joseph Dennie thirty years later obtained from the Portfolio a scanty living, and Charles Brockden Brown fared no better with his novels. Washington Irving was the first to make a conspicuous success in this country as an author, and up to a comparatively recent date those who followed him found little profit in authorship. A copyright law was early passed by Congress, and has once or twice been amended. American authors have labored under a particular disadvantage as compared with those in other nations. Books could be procured from Great Britain of every kind, and the productiveness of that country was so great that American publishers could obtain books of almost every kind without paying for them. The other literary languages of the world, Italian, German, French and Spanish, have never been spoken by two great nations at once. In the latter instance, which seems an exception, the productiveness of authors in the drama, poetry and other light literature had ceased in Spain itself before her colonies had attained sufficient numbers and wealth to compete with the mother country. But England until very recently furnished all the verse and prose we needed, except for school-books and history, and, owing to our defective laws, all general works could be reissued here by "piratical" firms without asking leave from original publishers. There was consequently no encouragement for Americans to engage in writing. We have under our progressive development given support to many native writers, but while in most branches our attainments are respectable we still to a great extent depend upon England for our fiction. The accompanying illustration is taken from a sixteenth-century book, and shows the popular idea at that time of the way in which the author labored. See under BOOK, COPYRIGHT, LITERARY PROPERTY and PUBLISHERS.

AUTHOR AT HIS DESK—SIXTEENTH CENTURY.

Author's Proof.—A clean proof sent to the author after the errors have all been corrected. It is denoted when abbreviated by A. P. A second and even a third proof is sometimes sent. These proofs should always be returned as soon as possible, as it is rare indeed that a form will reach press within two days from the time it leaves the author. Authors who are not bred to the printer's trade should carefully study the marks to show how corrections are made under the article PROOF-READING. If they have no guide of this sort, the proof can generally be amended by writing out the correct word or words at full length on the margin, taking pains to form each letter carefully. Few lines will stand a difference of more than four or five letters, and most not over two or three. For instance, if it should become desirable to change the word "a" to "every," the compositor would often be obliged to run a word over into the next line. Changes from copy are always charged for; if not against the author, then against the publisher. To add three words will sometimes take half an hour, and five lines have been known to take a day with a slow workman. The matter must be moved over from page to page, and is liable to be pied at any time. The corrections on the last Encyclopædia Britannica amounted to twice as much as the typesetting, and this is by no means an extreme case. It behooves authors, therefore, to write their copy with extreme care and to make very few corrections from it.

It is safe to say that authors, if inexperienced with the press, had better leave the method of capitalizing, punctuation, division, compounding and spelling to the printer, if he is a good one. One of the most surprising things to an author, when he attempts to read a proof that has not been read before, is the number of errors that can be marked by an experienced man, and the number that an inexperienced one leaves unmarked. Some authors by long practice have learned many of the details of the press, but in the beginning they were very ignorant. Whether civilise or civilize should be used; whether Catherine takes an a or an e in the second syllable; whether an s is upside down; whether progress should be divided pro-gress or prog-ress, they do not know. When they decide, it is with insufficient knowledge. The proof-reader has spent his life in considering these questions and ought to be a better judge. But the author's proof is of great value to the printer who aims at correctness. By some writers the words when and where are so written as to appear almost identical, and hundreds of others are not properly formed; there are failures to mark where quotations begin and end; proper names need to be verified, tables added up, awkward expressions rectified, and a thousand things done that the printer's reader cannot do. His business is not to edit the copy, but to mark printers' errors. Copy should be written with great care, and any sheet that has many interlineations should be written again; proper names which are at all uncommon should be spelled so that each letter should be separate and approximating the printed form, and words used in an unusual sense should also have the same care taken with them. The better the copy the better the proof. The author receives no proof until it has once been read and corrected, and therefore the worst errors are winnowed out of the sheet. Things that he is particularly to notice are marked on the margin with qy or ? The headings, tops of pages, Italic and small capitals should be looked over with great care. Errors are more likely to occur in these and in the notes than anywhere else.

Autograph.—Written by the hand of the author. It differs from a holograph. That is entirely in the author's handwriting, but an autograph letter or document may have nothing but the signature in his penmanship.

Autography.—A method of transferring drawings from paper to stone.

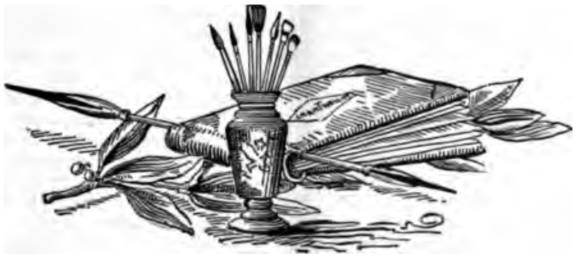
Auxiliary Printing.—A method by which a part of a newspaper is printed in one place and then sent to another, where it is completed. The economy of it is that the part done first, which generally contains much more reading matter than that afterwards set, is used over and over again for other newspapers, so that the whole is afforded to the country printer at about the price he would have to pay for the white paper alone. The introduction of this method of working is chiefly owing to Kellogg, of Chicago, and Aikens, of Milwaukee, who systematized and enlarged this business, if they did not indeed found it. The business in the simplest form consists of a composing-room, where the type is set; a pressroom, where it is printed; a delivery department, as these sheets must leave at a certain time, which must be very closely observed, and an advertising department. Matter is set up sufficient for the largest weekly, mostly of agreeable miscellany, but there is also news added day by day, that which is a week old being killed at the same time. In addition Democratic matter, Republican matter, agricultural clippings, religious reading and a temperance department are used. Most of the auxiliary offices print about two hundred newspapers, about a third of each being Democratic, another third Republican and the other portion neutral. The Republican paper, however, may have a religious and a temperance department, or both, and the Democratic newspaper may have an agricultural department. The matter is changed as the papers are made up. An eight-column quarto will be made up, and after all of that size are worked off, the heads and possibly some of the sub-heads being changed, the seven-column quarto will go on, and so on down to the five-column quarto, which is the smallest; the matter then is made up for a nine-column folio, followed by an eight, and then the other sizes. Democratic matter must be changed for Republican; special columns of advertising must be inserted, and a multitude of other details observed. To carry on this business requires a very swift and accurate make-up. The composition does not amount ordinarily to more than three hundred thousand ems a week for the entire establishment. The press must be such a one that the make-up can get at it very easily, when he does not desire to lift a form. The runs are small, averaging in the West not much over two hundred and in the East about five hundred. The advertising department is very important, for there is no attempt at making profit out of the composition, paper and presswork. The value of the establishment to its proprietor consists in its advertising, and this is systematically collected. There are in the United States about eight thousand newspapers issued on this plan, familiarly known as patent outsides or insides. These establishments also print entire newspapers, and their typographical appearance is generally very much better than it would be if executed in country offices.

Avant la Lettre (Fr., before the letter).—It is customary to strike off from an engraved copper or steel plate a number of impressions before the name, dedication or any other words are cut under the engraving; and as these impressions are, of course, the best they are distinguished by the title avant la lettre, and always bear a higher price than the common impressions. Some of them are extremely dear.

Avventizi (Ital.).—Job-work.

Avvicinamento (Ital.).—In types, the natural distance which exists between the letters, either at the side or up or down.

Azuré Tools.—Those in bookbinding in which the heavy and wide marks, instead of being a solid mass, are made with horizontal lines.



B

B THE second letter of the alphabet, is one of those which are not most used, although in biographical works and cyclopædias it generally requires as much space as any other. In them b. frequently stands for born. It represents the seventh note in the musical scale, and among the Romans sometimes stood for the number 300, and with a dash over it for 3,000.

Baar-Sortiment (Ger.).—In Germany, a jobbing-house in miscellaneous books which keeps an assortment of the standard works, tastily bound, and generally sells them at the same net prices as the publishers themselves. The latter, in many cases, do not carry their books bound, but issue them in paper covers. The former sells only for cash.—*Caspar.*

Babcock, Nathan, who is one of the oldest living manufacturers of printing-presses in this country, was born in Westerly, R. I., on November 19, 1824. He was brought up on a large farm in Stonington, Conn., where he acquired a robust constitution, industrious habits and such education as was afforded by the common schools of that time. At the age of fifteen he went to Westerly, R. I., where he remained for two years, and received the somewhat better training given by the schools of that place. In May, 1842, he was apprenticed to the machinist's trade in Warwick, R. I., and remained there thirteen years, during which he passed through the progressive steps of apprenticeship, journey work and contract work. In 1855 he, with C. B. Cottrell, established the firm of Cottrell & Babcock to carry on a general machine business. Circumstances, however, soon led to the manufacture of printing-presses, and this so grew on their hands that all the energies of the firm were given to this special branch of machine-building. In 1880 Mr. Babcock sold out his half-interest and retired from the firm. In 1882 he associated with Charles B. Maxson and George P. Fenner in organizing the Babcock Printing-Press Manufacturing Company, of New London, Conn. Both of these gentlemen are young, skillful and energetic. Mr. Maxson is president of the company and is favorably known all over the country. Mr. Fenner, the superintendent, is an inventor and organizer of note.

NATHAN BABCOCK.

Babcock Printing-Presses.—These presses, which cover a number of styles, are manufactured at New London, Conn. They are all large cylinders, with the exception of the Artifex, a lithographic machine. They range from medium to quadruple super-royal, and are distinguished for ease in running, the termination of the motion at each end without jar, the facility with which the form can be reached without lifting and the stiffness with which the form and cylinder come together, thus securing a very rigid impression. The styles which have been out for some years are the Regular, the Country and the Standard, and more lately the Optimus and the Dispatch.

Back.—This is used in bookmaking in several different senses. 1. The back of a type is that part which has no nick, and which, of the four sides of the stalk, is the nearest to the top. 2. In imposition it is the margin at the side of the page of type which is farthest from the wide margin. 3. In bookbinding it is the part where the principal fold is and where the cover is attached. It is also the part of the cover between the two hinges, and is generally slightly rounding.

Back Board.—In a wooden hand-press, a board or boards so placed as to defend the ribs from dirt and to make a convenient shelf for the pressman.

Back Boxes.—A term applied to the unoccupied boxes of an upper case, generally the upper ones, but in England sometimes the lower ones, which are covered up by the galley.

Back Mark.—A mark upon the laying-on board of a printing-machine.

Back Pages.—The even or verso pages of a printed sheet; the last pages of a book.

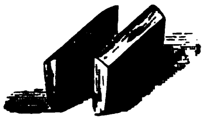
Back Side of the Form.—That part of the form which touches the imposing surface or bed of the press.

Back Stay.—The piece which prevents the bed of a press from running out too far.

Back Up.—To reverse the motion of a machine.

Backing.—1. In electrotyping, filling the shell with metal, so as to make it solid. The film, as deposited in the battery, is extremely thin, varying from the thickness of the finest tissue paper to that of an ordinary newspaper. To be used, it must be supported by a considerable thickness of solid metal. The copper will not adhere directly to the type metal or electrotype metal resembling that used in type without an amalgam. This is frequently obtained from zinc upon which muriatic acid has been poured. The fluid thus resulting is placed evenly over the back of the shell with a brush. After this is done tin solder is applied in the shape of a powder over the film, which is then lowered to the surface of the pot containing the backing-metal. The heat gradually extends itself to the shell and the solder, and when the latter is fused the shell will be tinned all over the back, and ready to receive the fused type metal. When this is done melted metal should be poured over the shell and amalgam until it is thick enough, which is considerably thicker than it is at last to appear when prepared for the press. It is then ready for trimming and finishing. The process described is that used in England; the American method will be described under ELECTROTYPING. 2. In printing, doing the second side of a sheet. 3. That part of binding which consists in getting the back into its true shape and forming the groove for the cover to rest in. The back is always a little thicker than the sheets away from the back, as the fold in each signature is there, as well as the threads in sewing, and a short distance away from it pressure is applied, so that there is a crease or hollow. Immediately beyond the covers the sheets at the back bulge out something like a fan.

Backing-Boards.—Boards having a slightly thicker back than front, and a little longer than the book to be bound, which are laid against it on each side when it goes into the lying-press. They serve to make the crease at the back of the book. They are of wood, wood faced with metal, and metal.



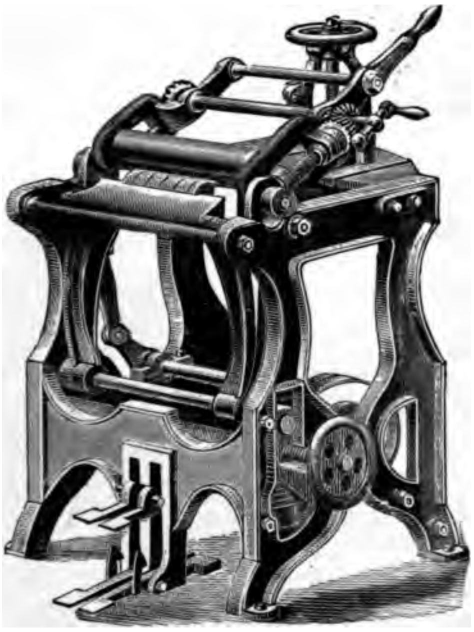
BACKING-BOARDS.

BACKING-IRON.

Backing-Hammer.—The hammer used for backing and rounding; it has a broad, flat face similar to a shoemaker's hammer.

Backing-Iron. — A piece of iron with rounded grooves in it, against which the book rests when backing is done.

Backing-Machine.—A machine used to round the backs of books and to make the groove near the back.



BACKING-MACHINE.

Backing-Metal.—A metal used for the backs of electrotype plates to bring the thickness up to the standard, the electrotype itself being a mere shell.

Bad Color.—Sheets with too much or too little ink upon them, or upon which the ink is uneven.

Bad Copy. — Badly-written manuscript or copy which is difficult to set. Compositors usually work by the piece, and anything which prevents them from making their accustomed speed comes under this head. The handwriting may be bad or there may be peculiar letters or characters in the copy which are difficult to find.

Bad Lay.—A sheet badly laid or placed in printing; out of the square or centre.

Bad Register.—In printing the second form, if pages do not back correctly. See REGISTER.

Badius, a printer of the sixteenth century, whose full name was Jodocus Badius Ascensius, began at Lyons as a corrector of the press for Trechsell and De Wingle, and afterwards married a daughter of the former. On the death of Trechsell he went to Paris and began business there. He returned to Lyons in 1515 or 1516, devoting himself particularly to the Latin classics. He was a great admirer and imitator of Aldus. He chose for a design a press (see next page), with two men working at it, and the motto "Prelum Ascensianum," the Ascensian Press. He died in 1535.

Bag Cap.—In England, a size of brown paper, 24 by 19½ inches.

Bagley & Sewall Presses. — These presses are built under patents of the late Andrew Campbell, at Watertown, N. Y. The Country press is simple, strong and comparatively noiseless. There are also the Complete press, the Job and News press, the Job and Book press, the Book press and the Lithographic press. The Book press has distribution at each end.

Bailey, Mrs. Lydia R., a printer of Philadelphia, who carried on business there successfully for many years. She began her business career about the time of the second war with Great Britain, and continued for more than thirty years, then retiring with a competence. She survived the Civil War.

Bake.—When the compositor lays up a form to clear it away, after a work is finished, if he does not rinse the letter as well as if it were rinsed for present use, or rather better, the ink, which is dissolved among the lye, will, with long standing by, harden between the letter and make the letters stick so fast together that when they are to be distributed the compositor cannot, without great difficulty and trouble, get them asunder. This sticking together of the letters is called "baking," and compositors in this case say the letter is baked.—*Moxon.*

Baker, Peter Carpenter, a leading printer and publisher of New York, was born at North Hempstead, Long Island, on March 22, 1822, and died in New York on May 19, 1889. His parents removed to the metropolis when he was very young, and after a course at the Harlem Academy he entered the printing business, being first with John H. Kasang. He was afterwards with William E. Dean in a book-store, and then entered the employment of John F. Trow, the printer, whose office was at that time the largest in the city. Here he soon became foreman, and held that position until 1850, when he went into partnership with Daniel Godwin and John Thomas under the style of Baker, Godwin & Co. They bought the materials of the late William Osborn, and immediately entered upon a most profitable business. Mr. Thomas withdrew after five years, and the remaining partners then continued as Baker & Godwin, a title which was kept up till Mr. Godwin's death, thirty years after. In 1866 they purchased an interest in the law-publishing business of John R. Voorhies, and after-

PETER CARPENTER BAKER.

wards the whole was acquired by them, being conducted as Baker, Voorhis & Co. At the time of his death Mr. Baker was the sole owner. Early in life he became a member of the Typographical Society, filling its principal offices and taking a very active part in its management. In 1850 he delivered an address on Franklin before it, which was repeated in 1865. He was an easy and effective speaker, and delivered orations at Fort Independence, N. Y., July 4, 1848; Trenton, N. J., July 4, 1849, and at the Broadway Tabernacle on the anniversary of the battle of Bunker Hill in 1853. He made an extended tour in Europe in 1860 and 1861, and after his return published an account of his impressions. When it was proposed to erect a statue of Franklin in Printing-House square, New York, he took hold of the project actively and brought it to completion. He was also concerned in the raising of the monument to Horace Greeley which now stands in Greenwood. With Mr. Theodore L. De Vinne he was the originator of the Typothetæ, which was first organized in 1863, and continued a member till his death, although not then in the printing business, that having been sold to Willis McDonald & Co. Much of the hardest work in its formation was accomplished by him, and he was on many committees. He belonged to several clubs and was active in the management of the Hahnemann Hospital. A great part of a book entitled American Oratory was written by him, as well as the latter half of the Voices of the Press, a volume of poetry by printers, with many biographical notes. He was a natural leader, a thorough printer and an excellent man of business. His means in the latter portion of his life were large. In his manners he was very pleasant, uniting both tact and force, and his personal appearance was very attractive. He left a widow and three daughters.

THE PRESS OF BADIUS ASCENSIUS.

Baine, John, a Philadelphia type-founder, was originally from St. Andrews, in Scotland. A townsman of his, Alexander Wilson, induced him to begin the type-founding business with him in London. Neither had any knowledge of it, and after a time, seeing that success was not coming there, they returned to Scotland and set up a foundry at St. Andrews. Being painstaking men, with good parts, they were finally successful, as there was great need of a foundry in that country. In 1744 they removed to the neighborhood of Glasgow, and three years later Baine was chosen by lot to represent the firm in Ireland, where they had considerable business. In 1749 the partnership was dissolved, Baine going to London and Wilson pursuing the occupation in Scotland, where he acquired a great reputation. After being in London some time Baine returned to Scotland, and at the close of our Revolutionary War started a foundry in Philadelphia, apparently, however, being still in business in Edinburgh. His grandson had probably preceded him. Thomas says that they had full employment and were good workmen. John Baine died in the year 1790, aged seventy-seven. His grandson, who relinquished the business soon after, died in Augusta, Ga., about 1799. These were the first American founders who carried on type-founding alone for any length of time. They had no followers until Binny & Ronaldson began business.

Balaam.—1. Matter kept in type for filling up odd spaces in periodicals, generally refuse bits; the words of an ass, who talks like Balaam's ass. 2. A slang term for the receptacle containing rejected MSS. These words and their definitions must have very little currency, for they are unknown to New York printers.

Ballantyne, James, a printer in the city of Edinburgh, renowned for the beauty of his printing, but still more distinguished as the friend and printer of Sir Walter Scott, was not bred to the occupation, but had been trained to the law. He was born at Kelso, Scotland, in 1772, and when a little over twenty years of age opened a printing-office in his native place. In 1796 he began the publication of the Kelso Mail, and soon after meeting Scott in a stage-coach renewed the intercourse of former years, when they had been school-fellows. Shortly after this he published a volume of Scott's translations from the German, and at a later date removed to Edinburgh. From that time he printed all of Scott's works, and the poet was able to send many other persons to him with orders. From 1805 until his failure in 1826 the two were partners in the printing business, although this was not known to the world at large.

Ballantyne's work was always executed exceedingly well, and many compliments were paid him. It is probable, however, that most of his profits were applied, after the manner of printers generally, to increasing his stock, and in Sir Walter he had a partner who was continually drawing on the resources of the firm. Scott was desirous of founding a family with landed possessions, and the house he erected, with the improvements he put around it, swallowed up £100,000. Ballantyne was also involved in the failure of Constable, the indebtedness of the firm being £105,000. Ballantyne never recovered from this, and died January 17, 1833, Sir Walter having preceded him on September 21. They were good friends to the last, and one of the printer's last wishes was that he might be spared to do justice to the great and good man who had gone before him. He was an excellent declaimer, a good critic and an extremely pleasant companion. His younger brother, John, was an inimitable story-teller.

Ballhorn, Friedrich, a foreman in Brockhaus's printing-office in Leipsic, who published Alphabets of Oriental and Occidental Languages for the Use of Compositors and Proof-Readers. It was issued in 1844. The whole was done with metal types. An English edition was published in 1861. Ballhorn died in 1873 or 1874.

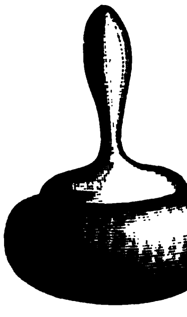
Ball Necks.—That part of the stock of the ink-ball between the handle and the pelt.

Ball Racks.—Pins of wood driven at an angle of 45 degrees into a piece of wood, between which the balls were hung. They were nine inches long and three inches apart.

Ball Stocks.—The frames upon which balls were made. They were of dry, well-seasoned elm and turned hollow, so that they looked like a wooden bowl, with thick sides and small capacity, in comparison with the outside measurement. At the bottom was a handle, four and a half inches long and one inch in diameter. The stock itself was five and a quarter inches in diameter. Within the hollow of this bowl, but overrunning it, was placed wool, and over this was nailed a sheepskin. See BALLS.

Ball Tickets are generally very ornamental, embossing and gilding being profusely used. Admission to very fashionable balls is usually by tickets which have been engraved.

Balls.—Round cushions stuffed with wool and with a handle to them, used until about sixty years ago to cover the type with ink. They do not seem to have changed much in appearance for three hundred years, as early prints show them substantially as they were during the first quarter of this century. After the discovery of roller composition they were made of this substance and continued in use in some special work here until about 1850, but in England they have been made until within the last ten years, if, indeed, they are not now. The original balls were made of untanned sheepskins, the size being like that of boxing-gloves. They were prepared by stretching, treading, soaking and currying till they were thought sufficiently good to do the required work. As the soaking was in chamber lye the pressroom always had a disagreeable odor, which it lost when composition balls and rollers came into use. The preparation of the pelt balls, when the wool was put in and the necessary shape obtained, was known as knocking up. Balls of sheepskin are still used in South America, being made in New York for that purpose.


INKING-BALL.

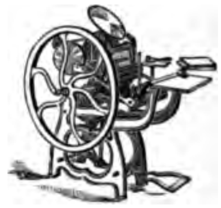
Balsam of Copaiva.—A prepared gum which has been much used in the manufacture of printing-inks. With this balsam, says a former writer, a due proportion of soap and coloring matter, and a stone and muller, any printer may speedily make an ink of superior quality with very little trouble. The article sold by the druggists as balsam of copaiva is frequently so much adulterated that it is of no value for making printing-ink, being thin and weak when it should be strong and viscid. It should be remembered that ink prepared with this article is apt to impart an offensive odor to the printed page.

Baltes, Frank William, a printer of Portland, Ore., was born of German parents in the then Territory of Washington on March 19, 1860. He spent his early school-days in Chicago, and after returning to the Pacific coast he entered the printing-office of the Astorian, in Astoria. This was in the year 1873. Nine years later he began business in Portland, under the name of F. W. Baltes & Co., their establishment now being the largest north of San Francisco. He has been a delegate to every meeting of the United Typothetæ of America since its formation, traveling over six thousand miles to attend each, and is now the secretary of the local society. He is also very prominent in Masonic matters.

FRANK WILLIAM BALTES.

Baltimore, one of the principal cities of the Union, began printing before the Revolution. William Goddard, who was taught his trade in New York, opened his office in Baltimore in 1773. The most conspicuous periodical of its earlier years was Niles's Register, a repository of the facts of the day. It lasted for many years. There are many daily and weekly papers published there now, and there are about one hundred and thirty printing-offices. The work is chiefly commercial and labels, little pure bookwork being done. In earlier years, besides Goddard, there were in Baltimore Hodge & Shober, Nicholas Hasselbaugh, Eleazar Oswald, Hayes, and Mary Katharine Goddard. Later came John D. Toy, Murphy, the Catholic publisher, Abell and others; and in our day Boyle, Bridges, Deutsch, Weil, Cox, Jones and many others.

Baltimore Jobber.—A jobbing-press, with disk distribution and movable platen, made by J. F. W. Dorman & Co., in Baltimore. It is claimed to be very strong and to run very easily.


BALTIMORE JOBBER.

Banca (Ital.).—The accounts of a workshop.

Band, Bände (Ger.).—Volume, volumes; literally meaning "something bound," even as volume originally meant the roll of manuscript, in which shape books were first produced.

Bändchen (Ger.).—A volume of small size.

Band-Driver.—A blunt chisel used in forwarding to correct any irregularity in the bands of flexible backs.

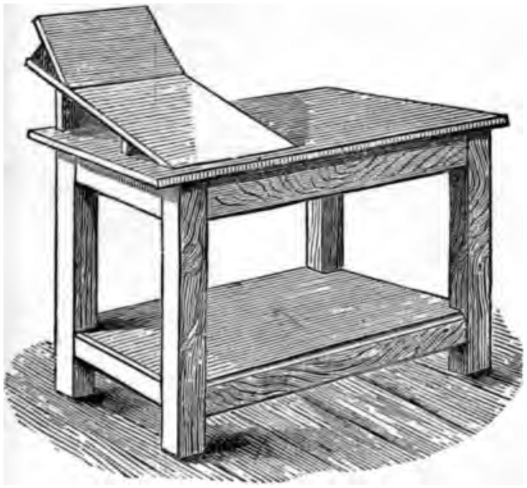
Band-Nippers. — Pincers used to pinch up the bands at the back of books, so that they will stand out more clearly.

Banddeckel (Ger.).—Book-cover, cover; die Banddeckel lose, covers loose.

Bandes, les (Fr.).—Ribs of the carriage.

Bands.—The cords upon which the sheets of a volume are sewed. The cover, when it is put on, will show these as little ridges or projections. Much work is, however, sewed so that the cords are imbedded in the back of the sheets, and, of course, when the cover is applied there are no projections. To give this appearance little strips of leather are glued across the back, next to the paper, and the back then appears as if the bands were there.

Bank.—The high, strong table upon which the pressman places his paper. As generally made, an inclining part is put at one side. In Moxon's time the table was called a horse, but this usage seems to have changed shortly after, as the term horse was applied in England in Hansard's time only to the desk portion. The horse was made sloping down to the fore-edge, and the white paper was placed upon it. The pressman was thus enabled to draw the sheets down with his thumb-nail or a piece of wood, bone or ivory with more facility than if it were laid horizontally, and it is more convenient to remove to the tympan, as the horse is raised near to it and inclines in the same direction. As now made the bank is usually about four feet long, two feet wide and three and a half feet high. About five inches from the bottom a board is fastened to the legs, which serves as a convenient shelf for worked-off heaps. The paper-horse, of a convenient size, is also made of wood, and arranged so as to slant at an angle of about 30 degrees. It is placed at the end of the bank nearest the tympan, and is used for supporting the paper immediately before it is worked off.



BANK AND HORSE.

Bank-Notes.—These in the United States are always printed upon steel, the paper being firm and strong. In England the notes of the Bank of England are printed upon a hand-press in the typographic way. But in both countries, and indeed everywhere, extraordinary precautions are taken to guard against counterfeiting. The first requisite in the United States is to have the very best talent employed in making the plates. If we take it for granted that there are one hundred plate-engravers in the Union, which is much beyond the correct estimate, it will be certain that eighty of them can do common work only, and are not fitted to engrave artistic landscapes and portraits. The twenty first-class engravers do the fine work, and the number being so limited it is manifest that if an extraordinarily good counterfeit appears it must be the work of one of them, and as their characteristics are known an expert can readily name the author of the work in question. He would be under the surveillance of the detectives immediately, and if a man of bad habits and one who consorted with the criminal class, although not previously a forger, suspicion would be at once directed against him. But the bank-note is not made up of one piece. One man designs the vignettes, another does the lettering, a third the portraits and a fourth the scroll-work. Each of these parts is executed upon a small piece of soft steel, which is afterwards hardened, and then in turn driven into another piece of soft steel from which the printing is to be done. This also is hardened. These designs are interchangeable. The same head of Franklin that is at the left-hand side of a note of the Saco Bank of the denomination of $2 may be at the right-hand side of a Portsmouth note for $5. Thus these parts of a design can be used over and over again, and if $500 or $1,000 are expended for a head, or $50 for three or four letters, the fact that such a piece can again and again be employed in other places renders this work comparatively cheap. No single engraver, however great his skill, could hope successfully to counterfeit an entire bank-note. A second precaution is in the quality of the paper. This is generally of linen, with small fibres of silk interspersed. Jacob Perkins, of Massachusetts, discovered that steel could be softened and engraved upon and afterwards hardened. He went to England with his discovery in 1818, and in conjunction with Mr. Heath, an eminent London engraver, accomplished considerable work. But in America, with several thousand banks, and with the necessity of guarding against counterfeiting by resorting to superior work, instead of relying upon the terrors of the law, the business long since became very large. The separate engravers combined for their own convenience, until now nearly all the printing is done by one establishment, the American Bank-Note Company, or by the United States Government. There are a number of other engraving companies which do more or less of this work, but the bulk of it is with those just named. The greatest of care is exercised in every department. The paper is made at a particular mill, which does not sell to the public generally, but only to the persons and corporations it knows to be responsible. The sheets are packed together in certain quantities, are counted before they go to the printer, and are again counted when they are received at their destination. At the mill a strict scrutiny is maintained to guard against the loss of any of the whole sheets or broken sheets. When the paper goes to the press it is again counted, and from that time on is counted and recounted until paid out by the banks or the government. The best ink is used, and the paper wetted with great regularity. The best workmen can hardly exceed six hundred impressions in a day. The sheets are left to dry for several weeks, and are then subjected to a heavy pressure in a hydraulic or other standing press. When a high polish is required it is effected by again subjecting the printed sheets to pressure between hot plates. This is, however, said to weaken the paper. It has been thought desirable to print in green or red upon the face or back, but while this increases the difficulty of counterfeiting, especially by the use of photography, it does not prevent it. Any device used by a bank or the government can be imitated by an expert forger, but the chief reliance of the government and the companies is upon the fact that they have the pick of all the engravers and enjoy all the facilities, while the imitators must always work at a disadvantage.

Bank Paper.—A thin paper mostly used for foreign letters, or to save cost of postage, which a heavier paper would require. Thus used in England.

Bar.—In a hand-press, the long handle which is caught by the pressman and brought towards himself, thus forcing down the platen upon the bed. In the wooden hand-press it was about three feet long, and fitted into the eye of the screw, so that the latter could be turned or partly turned around.

Bar Roll.—In gilding, a little roll or wheel having lines upon it, transverse to its edge, which is run over the gold, pressing it in where it makes hollows.

Barber, John, the first printer who became lord mayor of London, was the son of a barber in that city. He served his apprenticeship to printing there, and shortly after embarked in the business himself. Being threatened with a prosecution by the House of Lords for an offensive paragraph in a pamphlet he had printed, and being warned of his danger by Lord Bolingbroke, he called in all the copies from the publishers, cancelled the leaf which contained the objectionable words and returned them to the booksellers with a new paragraph supplied by Bolingbroke, so that when the pamphlet was produced before the House and the passage referred to it was found to be unexceptionable. He added greatly to his wealth by the South Sea scheme. He was appointed city printer March 22, 1709. He was subsequently made alderman; in the year 1729 he served as sheriff, and in 1733 as lord mayor. In politics he was a Tory. He died January 2, 1741.

Barbou. — A celebrated family of printers, beginning in the sixteenth century. The works of their press were distinguished for their neatness and correctness. At the beginning of the eighteenth century the family settled at Paris, where Joseph Gerard Barbou continued the collection of Latin classics in duodecimo which Coustelier had begun. There were seventy-three volumes in all.

Barclay Press, otherwise known as a rotary Stanhope press, was brought out in London in 1822. It depended upon the pressure of a roller, beneath which the form passed.

Barge.—A small wooden box with six or eight divisions, used in England for holding spaces to alter justification in making corrections.

GEORGE D. BARNARD.

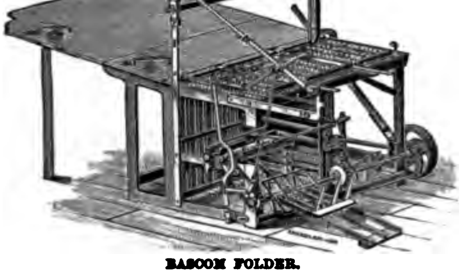
Barged Case.—In England when a case is uneven with the various sorts, some full, others empty, it is thus described.

Barnard, George D., a printer of St. Louis, was born in the year 1846. He attended school until about the beginning of the Civil War, then entering a printing-office and learning the rudiments of the business, as well as carrying a newspaper route. In 1863 he changed his occupation, going into a shoe shop, but returned to the printing-office the next year. Here he busied himself chiefly with the orders, and from 1864 to 1872 traveled as a solicitor in this line. His acquaintance and business connection having become large, he began for himself in 1872, and is still hard at work, the title of his firm being George D. Barnard & Co. A very large line of their work is making blank-books. Mr. Barnard was one of the original members of the Typothetæ of St. Louis, and has been a delegate to each of the conventions of the United Typothetæ and a member of its executive committee.

Barre, la (Fr.).—The long cross.

Barreau, le (Fr.).—The bar, the lever, of a press.

Bascom Folder.—A folding-machine manufactured at Sidney, Ohio, for newspaper use. It can be used either as a three-fold or four-fold machine. It is light and simple, weighs about four hundred pounds and occupies a floor space of about four feet square. A speed of twelve to eighteen hundred an hour is claimed for it.


BASCOM FOLDER.

Base Secretary.—A face of type once in use, a modification of the Gothic. Many of the angular lines are omitted.

JOHN BASKERVILLE.

Baskerville, John, an English printer, publisher and type-founder whose works gave him a very high reputation in his day, was born at Wolverley, in the county of Worcester, England, in the year 1706. In his early life he served as footman to a clergyman, but this employment does not appear to have kept him very long, for when he arrived at the age of twenty he was a writing-master at Birmingham. His penmanship was very good, and he soon began engraving, both on stone and metal. Later he entered the japanning business, in which he accumulated a comfortable fortune, and purchased an estate, to which he gave the name of Easy Hill. About the year 1750 he turned his attention to printing, and conceived that it would be possible to print works in a finer style than had hitherto been known. To do this required a conjunction of new and beautifully-cut type, excellent ink, fine paper and painstaking presswork. Nothing was to be neglected. It should be remembered that at this time Dutch types were still largely in use in England, because they were better made than those of home manufacture, with the exception of those produced by Caslon. Before Baskerville printed his first work he had been for six years experimenting upon his plans. He engaged the best punch-cutters that could be had; he made his own molds, ink and presses, and, in fact, almost everything that was required. The punches for his first font of letter cost him £600, or according to Dibdin £800, a very great sum when the cost of labor at that day is considered. The earliest of his works was a Virgil, which was issued in 1757. It was accompanied with a specimen of his types, a Roman and Italic of great primer, slender and delicate in form, combining, as Dibdin says, in a singularly happy manner the elegance of Plantin with the clearness of the Elzevirs. The Italic letter was especially admired for its freedom and symmetry. He shortly after was intrusted with the cutting and casting of a new Greek font by the University of Oxford. It was not a success. Mores said of it that it was execrable, and the general opinion was that the cut was very bad. He made no further attempts at reproductions of Greek or other foreign types, but confined himself to English letter. His Paradise Lost, issued in 1758, is spoken of as an edition of great beauty, and he afterwards published, by permission of the University of Cambridge, a folio Bible and two editions of the Book of Common Prayer. The Bible is regarded as his chief work, and is, says Reed, his most magnificent as well as his most characteristic specimen. It appeared in 1763. After issuing that and the Prayer-Book he did little in printing for some years, but subsequent to 1769 he prepared a fine series of the classics in quarto. His foundry contained from double pica down to brevier, eight sizes, all cut by his own workmen, and this business was continued by his widow after his death, which occurred on January 8, 1775. She discontinued printing and publishing. Hansard did not think highly of his letter-founding, but believed that his reputation was gained upon his printing. In that respect this work would, he thought, challenge comparison with that of the best printer of the early part of this century. Baskerville's method of giving a finish to his work was as follows: "He had a constant succession of hot plates of copper ready, between which, as soon as printed, the sheets were inserted; the moisture was thus expelled, the ink set, and the trim, glossy surface put on simultaneously." The ink and presswork are beautifully clear and uniform. The paper is very fine, of thick texture and rather yellow. Baskerville was an atheist and very profane, and a biographer compares him in his person with Voltaire, whose sentiments he was ever retailing. His body was buried upright, without religious ceremonies. Mrs. Baskerville sold his stock of type to Beaumarchais for the Société Littéraire-Typographique for the sum of £3,700, she having received £12,000 from his other property, and in 1782 these types were used for the beginning of a collection of the works of Voltaire, at Fort Kehl, near Strasbourg. It extended to seventy volumes in octavo, not being completed till 1790, and was a prodigious loss to Beaumarchais, who found the edition waste-paper on his hands.

Basket.—In printing-offices in England where there are large fonts of letter, and the font cases of any particular one are not sufficient to hold the superfluous sorts, the surplus is put into coffins and deposited in round baskets till wanted.

Baskett, John, king's printer, was master of the Company of Stationers in 1714, and again in 1715. His position of king's printer was assigned to him by the executors of Newcomb & Hills, and included the printing of Bibles and Prayer-Books. With another right which he purchased he obtained sixty years in all, the last thirty of which he conveyed to Charles Eyre.

Bassendyne, Thomas, an early printer of Scotland, was born in that country and educated at Antwerp. He went from that city to Paris and thence to Leyden, where he learned the art of printing. He returned to Scotland in 1538, joining the Reformers. In 1576 he printed the Bible at Edinburgh, in folio form, with a dedication to King James. This was the first Bible in Roman letter printed in Great Britain. He published also some other works, dying in 1591.

Bastard Title.—A short title preceding the general or formal title of a book. It is much smaller and contains only the principal words, and is placed on the recto or first page of the leaf preceding the other title. When this is used the main title is on page 3 or iii.

Bastard Type.—Type with a face larger or smaller than its appropriate body. In this sense almost all newspaper faces are bastard, for they are from one to one and a half sizes larger than they should be. Our present agate is the nonpareil of 1800, with short descenders and ascenders, on a smaller body, and our minion is a brevier cast on a minion body. Brevier on long primer and bourgeois on small pica, with the like fonts, though once common, are now very rarely to be found. It was the practice of the New York Tribune for many years to employ such faces and bodies, as the matter presented the appearance of being leaded, while there were no leads to ride up. That journal was then printed on a type-revolving press. This term has also been applied, although incorrectly, to the sizes between long primer and pica, nonpareil and brevier, and to other so-called irregular bodies. In the beginning of printing there were very few kinds of type, but they gradually became more numerous. In the last century, and in the last quarter of the seventeenth century, when printing had become a comparatively large business, the art having been carried on for many years in substantially the same style, the first accounts of printing, relating to it practically, were written. They reflected the tone of the trade, which was in this matter that enough bodies had been cast, and that if any more were attempted they would prove unnecessary. The intermediate bodies shared in this dislike. The difference in size between long primer and brevier is only the thirty-sixth of an inch. Why make a type midway? Those that were in existence or that have since come into use were denominated bastards. They are diamond, agate, minion, bourgeois and small pica. Sometimes this term is applied to such sizes as paragon and Columbian, which, although regular, are uncommon.

Bath Note.—A folded writing-paper, 8½ by 14 inches.

Batter.—Type accidentally injured in a form by being smashed or struck.

Battitojo (Ital.).—A planer.

Bauer, F. A., the associate of König in the introduction of the power-press, was born at Stuttgart in 1783. He formed König's acquaintance in London, furnished the requisite mechanical skill to complete his designs, and when the former returned to Germany Bauer accompanied him. They began the manufacture of presses at Oberzell, completing their hundredth machine in 1838, and after König's death in 1839 Bauer carried on the business alone. He died February 27, 1860.

Baxter Method.—A kind of color work done by printing the contour or outlines from a steel-plate and the colors from wooden blocks; now rarely used.

Beading.—The small twist formed when fastening the silk or cotton in head-banding.

Beadnell, Henry, a proof-reader in London who wrote a Guide to Typography, A Key to the Main Difficulties of English Orthography, and Orthographical Difficulties Elucidated, all learned and valuable works for the trade. He was for many years principal reader for Wyman & Sons.

Beak.—The projecting part of an f or other kerned letter, thus ʿ.

Beano.—A slang abbreviation in England for "bean-feast," which is, however, usually termed "goose" or wayzgoose by compositors.

Beard.—The beard of a letter is that part between the face and the square, solid body; the inclined portion above the shank and between that and the face.

Bearer.—A strip of reglet or other furniture used to lessen the impression upon a blank page by bearing some itself. Types interspersed here and there in the blank parts of a page, when stereotyping is done, so that the impression may be even. They are cut off when the plate is finished.

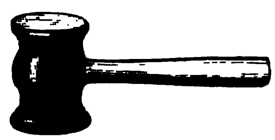
Bearer Lines.—Lines at the bottom and top of a page prepared for stereotyping. They are sometimes type, but properly should be characters cast for this purpose.

Beat Fat.—To give ample ink in beating a cut.

Beat Lean.—To ink a form insufficiently.

Beater.—A wooden implement used in the warehouse in packing, to make the ends and corners of a parcel lie flat and square.

Beating.—1. To put ink on type by means of balls. This was a more difficult operation than placing color upon a form by means of a composition roller, for it required much dexterity and also involved much hard work. The balls much resembled boxing-gloves with handles, and when the ink was applied were perfectly perpendicular. Ink was taken from the ink-block in small quantities, was rubbed out there, or sometimes upon a separate slab, and the two balls were then distributed against each other, care being taken that their position was constantly varied. Beating began at the left-hand near corner, and then in regular rotation went over the whole form. Every part was touched. Beating hard, close or strong was to beat repeatedly with force. The beater was obliged to look at the sheet frequently to see if it had sufficient color and was properly printed, the uniformity depending chiefly upon him. This work was always done by men or by strong apprentices. 2. To cause sheets to lie flat and compactly in bookbinding by striking them repeatedly with a hammer.


BEATING-HAMMER.

Beating-Hammer.—The heavy, short-handled hammer used in beating books in bookbinding, generally weighing about ten pounds in England, but less in America.

Beating-Stone.—The bed upon which books are beaten.

Becker, William Lamar, of St. Louis, was born in Cincinnati, Ohio, on August 18, 1847. He removed with his parents to St. Louis ten years later, and when fourteen began his business career. He entered the printing-office of Davis & Little in February, 1872, and shortly after formed a partnership with Mr. W. H. Little of that firm, under the title of Little & Becker, since changed into the Little & Becker Printing Company, of which he has been continuously secretary and general manager. This house has been very successful. Mr. Becker was one of the original members of the St. Louis Typothetæ and has been a delegate to each of the meetings of the United Typothetæ. At the session of 1890 he was elected the recording secretary.

WILLIAM LAMAR BECKER.

Bed.—The flat part of a press, upon which the form is laid.

Bed and Platen Press.—That kind of a printing-machine in which the form, lying upon a flat bed, is forced against a platen or the platen is forced against the form. The Treadwell press was an example of this, as was the Adams press later, and the term is also applied to the little jobbing-machines, the majority of which work on this principle.

Bed of the Frame.—The lower part of the frame, which forms a shelf on which surplus sorts, &c., can be placed. Unknown in America.

Begin a Fresh Par.—To commence a fresh paragraph by means of indentation. This abbreviated use of the word paragraph is an English expression.

Begin Even.—To begin composition in the middle of a paragraph, the preceding take ending with a complete line. This requires much care on the part of the workman who has the first take.

Beigebunden (Ger.).—Bound in (with something else).

Beilagen (Ger.), **Bijlagen** (Dutch).—Supplements, additions; met gedrukte en geschrevene bijlagen, with printed and manuscript additions.

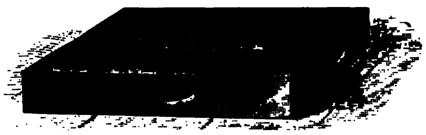
Bell, John, an English publisher and bookseller, who is generally reputed to have been the first who discarded the long s and introduced the short s at the beginning and middle of words. Reed, however, points out that this was done by Ames in 1740. The change by Bell was made in the British Theatre, which he issued about 1795, and was soon copied throughout Great Britain and on the Continent. It was quite general here in 1800, but it was 1803 or 1804 before the majority of books were thus printed, and occasional instances exist of the use of long s's in America as late as 1810. Some lines in Thomas's History of Printing, issued in that year, have them. In England they were used in some cases until 1824. Bell was an extensive publisher and owned several periodicals, and was a man of mark among the booksellers of his day. He died at Fulham, in England, February 26, 1831, in the eighty-sixth year of his age.

Bellows.—The ordinary domestic article used for blowing dust out of cases. If possible, this should be done in a vacant closet or room.

Bellows, John, a printer of Gloucester, England, who has produced the largest microscopic work of recent times, was born in Liskeard, Cornwall, in 1831, and became an apprentice at the age of fourteen to Llewellyn Newton, of Camborne. After the completion of his time he went up to London, but was soon involved in a dispute with the workmen in the office where he was employed, as they insisted he should complete another year. He refused to do so, and sought another place of employment. Shortly after this his health became impaired and he resolved to go into the country. He settled at Gloucester, where he worked for some time for a stationer. Complications came up which resulted in his going into business without capital, but with the assurance of work. This failed him, and he was in great trouble. He persisted, however, and his business soon began to improve, and has continued to increase. He began his French and English Dictionary while still working every day at his desk and managing his workmen. The labor of compiling this book was entirely performed by Mr. Bellows, but the putting of it in type involved many problems of condensation, as every effort was exhausted in getting as much matter as possible into the pages. The whole book only weighs seven ounces. It is printed in half brevier, with accents and Italics complete, on type specially cast for him by Miller & Richard. Twenty lines make an inch. Owing to the minuteness of the character the imperfections in the letters could not be seen in the type, and the early proofs were full of bad letters, which were gradually eliminated. The thoroughness of the work was very favorably spoken of, and since its original issue many thousand copies have been disposed of. He is still carrying on a successful business at Gloucester.

Belly.—The front of a type. Thus used in England. It is the part which has the nick.

Bench-Block.—A flat piece of iron upon which sheets are laid to be beaten in a bookbindery.


BENCH-BLOCK.

Bengalese.—A language spoken in Bengal, in the East Indies, being used there together with the Sanskrit (the learned dead language), the Persian and the Hindoostanee. It is intimately related to Sanskrit. It is the sole medium of personal and epistolary communication among the Hindoos of every occupation and tribe; all their business is transacted and all their accounts kept in it. There are fifty letters to the alphabet, the vowel which is pronounced with the consonant always following it, as ko, go, jo, but never as in English, ef, em, en. As this vowel principle is inherent, and no two consonants can be joined together in writing without violating the rules of grammar, a series of distinct characters are used to provide against the vowel or suppress it. These are called P,holas, and there are twelve of them. There are a number of contractions or special letters made by a ligature of separate letters. Several arbitrary marks are also used. The figures are different from our Arabic figures. The whole language is a very difficult one to compose, although there are no accents to be justified over or under the line, with one exception.

Bengel, der (Ger.).—In a hand-press, the bar or handle; the devil's tail.

Bengelscheide, die (Ger.).—The wooden handle or bar of a hand-press.

Beniowski, Major, the inventor of a typesetting machine which was not successful. He died in London, March 20, 1867, aged sixty-six.

Bensley, Thomas, an eminent printer of London, was the son of a printer in the Strand. He was early employed upon the best of work. One production of his was Macklin's Bible, which was brought forth in seven quarto volumes and was justly regarded as a magnificent specimen of bookmaking. His finest work was Thomson's Seasons, in 1797, in royal folio. In 1805 his establishment was injured by fire. When König went to England and attempted to construct a fast press, Bensley was his principal supporter. In 1807 he furnished the ingenious German with money, and it was in his office that printing was first successfully done by machinery, this being in April, 1811, and the first work being sheet H of the Annual Register for 1810. This machine of König, however, was abandoned, and the first really practicable one was that used on the Times, which was a wide departure from the Bensley machine. Improved presses were made for Bensley in 1816, but a fire which occurred in his place in 1819 destroyed his office, although all the machinery was saved. Shortly after this he discontinued his connection with the improvement, König having retired to Bavaria after the two had had a falling out. Mr. Bensley died September 11, 1835.

Benvenue.—A kind of entrance fee paid to the chapel by a workman on entering a fresh office in England. Derived from the French bienvenue, welcome.

Benzine.—A very clean, pungent-smelling fluid, used in printing-offices to remove ink from type or rollers. It is one of the numerous products of petroleum. Insurance companies do not generally allow more than a quart at a time in an office, unless special rates are made. Benzine does not gum or cake, and evaporates very rapidly, so that a form can be washed by it and almost immediately put to press again. From its drying so rapidly it does very little injury to wood-cuts, which would be destroyed if washed with lye, which takes a considerable time to dry.

Béranger, Pierre Jean de, the celebrated French poet, the most nearly akin in style and genius to Burns, was the son of a tailor in Paris. He was born in 1780 and died in 1857. He was first a tavern-boy and then a printer, having also been a clerk. His success with his verse led him to abandon printing, of which he had acquired considerable knowledge, and thenceforth he subsisted by his pen. He described his own career as "garçon d'auberge, imprimeur et commis."

Berechnen ein Manuskript (Ger.).—To calculate how much space copy will take; to cast off.

Berjeau, J. Ph., a late French writer on bibliography and the discovery of printing, whose books afford great aid to those who are studying these questions. Among his other works are the Speculum Humanæ Salvationis, Le Bibliomane, the Biblia Pauperum, and the Canticum Canticorum.

Berlin.—The capital of Germany and its principal city. Much printing is done there. It now possesses 334 printing-offices, giving occupation to 3,191 workmen and 1,006 apprentices, of whom 2,265 journeymen and 573 apprentices are in the Society offices, which number 137. Twenty-five offices, with 444 men and 129 boys, do not pay scale prices, and 172 offices, having 462 men and 394 boys, do not trouble themselves in the least about the scale. The Government or Imperial Printing-Office, which is situated there, is a very large one. It has a manager, 10 deputies and 700 compositors, pressmen, binders and other hands. The weight of the type is 350 tons.

Bernard, Auguste Joseph, a French writer on typography and bibliography, was born at Montbrison, France, January 1, 1811. He was the son of a printer. Among his published works are those upon Geofroy Tory, Antoine Vitré, the Stephenses, and the Origin of Printing in Europe.

Bestell-Anstalt (Ger.).—The distribution-offices at Leipsic and Berlin organized by the booksellers' organization, the mission of which is to receive daily all order-blanks for books, &c., and to distribute them to the various special agents of the publishers at the different places, who in turn dispatch these orders to the respective publishers, to be filled. These distribution-offices also send out all prospectuses, notices, letters, &c., issued by the publishers or booksellers, by transferring them to the local special agent, who forwards these papers together, in bulk, to the respective addresses, generally as inclosures with a regular parcel, which he sends to the retail bookseller for whom he buys and gathers books, &c.—*Caspar.*

Beveled Boards.—Very heavy boards with beveled edges, used for covers of books. Cards also sometimes have beveled edges.

Beveled Rule.—Rule made with the face all at one side, instead of having a bevel above and below it. This rule is intended for joining at the corners without a mitre.—*Southward.*

Bevels.—Pieces of metal cast nearly as high as type and having a beveled edge, used by stereotypers to form the flange at the side of the plate.

Bewick, Thomas, the modern reviver of the art of wood-engraving, was born August 12, 1753, and died November 8, 1828. He displayed great skill in drawing, which led to his being bound to a copper-plate engraver, Ralph Beilby. Dr. Hutton, the mathematician, some time after desiring to illustrate a work on mensuration, was advised by Mr. Beilby to use wood-cuts instead of copper-plates for that purpose, as they were much easier printed. He followed the advice, and the wood-cuts were executed by Bewick. He was highly pleased with his success, and he ever afterwards devoted his attention chiefly to wood. After his apprenticeship had expired he became a partner with his previous master. Gay's Fables, issued shortly afterwards, afforded him a favorable opportunity to show his skill, and in 1790 he illustrated a History of Quadrupeds, which attracted universal attention. From that time until his death he continued engraving, illustrating a great variety of books on almost all subjects. It was found that with him new graces had come. His graver was more expressive, his execution better, and his sense of the pictorial finer than that of any of his immediate predecessors. Indeed wood-engraving had become almost a lost art. His work was in line, the shadows being indicated by the greater thickness and closeness, while the lights were represented by very faint lines, far apart. His influence was great upon his contemporaries. Anderson imitated him, and to this day most regularly-bred engravers think his method is the only legitimate one and the only one which shows the best effects that can be made from the wood. Linton, the most eminent of recent engravers, is emphatic in his utterances upon this point. The making of collections of prints by Bewick is a practice common among connoisseurs and persons who love engravings.

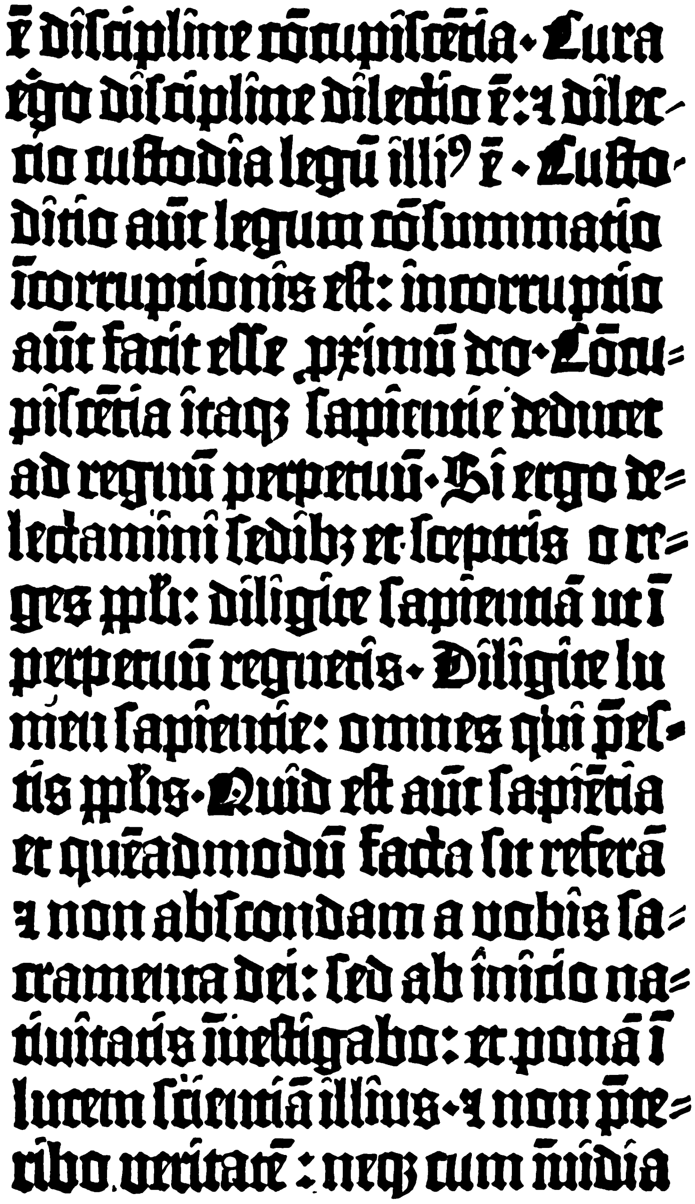
Beys, Giles, a Paris printer of reputation, who was the first to make a systematic distinction between the i and j and the u and v. He did not himself invent the separation, borrowing it from Ramus, who used it in a Latin grammar of 1557. Beys adopted it in Claude Mignaut's Latin Commentary on Horace. Beys was a son-in-law of Christopher Plantin. He died in 1593.

Bianca (Ital.).—The first side or the white paper, before any impression has been taken.

Bianchi (Ital.).—The quadrats and spaces, as well as all the other blanks and parts that do not print.

Bible.—The Bible has remained from the beginning of printing the chief work of the printing-press, as it had been for more than a thousand years before the principal book for copyists on vellum or parchment. There are very few manuscripts of Cicero, Demosthenes, Livy or Herodotus extant in comparison with those of the Bible. The Mentz printers issued two editions before the art was dispersed abroad in 1462, one of these being truly magnificent. Their reasons for choosing the Bible as the subject of their first attempt may readily be conceived. More copyists were employed upon it than upon any other work; it was extremely large and costly, and yet there was a demand for it which could be depended upon. This first Bible is generally known as the Mazarin Bible, from having been discovered in the library of Cardinal Mazarin. Like the other early books, it was without a title-page. Portions of the Hebrew text were printed as early as 1477, and the entire Scriptures in that language in 1488. Stephens's Greek Psalms, of 1539, is celebrated as being the first divided into verses. The version which Luther made in German fixed the standard of that language. Since 1450 a constant succession of Bibles has been published. In many languages it is the only complete book, as it was translated into them by missionaries, no other printing following, and in many others there are only a few additional books. The first complete English Bible in print was that of Coverdale, which is believed to have been produced at Zurich in 1535. Our present text is founded upon Wycliffe's, which was taken from the Latin Vulgate. This manuscript, freely circulated, had a powerful influence upon succeeding translators. In many places it will be noticed that the Common Prayer Book, used in Episcopal churches, varies from the King James version. This is because the Bishop's Bible or some older form was used. After King James came upon the throne he desired to distinguish himself by a new version, which indeed was needed. He therefore called upon the divines and learned men of that age to undertake it, and forty-seven of them were actually employed upon the work. Upon its completion it was universally recognized as the best that had appeared, and it is so regarded at the present time. The late Revised Version has fallen dead, so far as popular use is concerned.

Bibles have been printed in England only by patent, but in Scotland considerable freedom has been allowed.



ē diſcipline cõcupiſcētia. Cura
ergo diſcipline dilectio ē: ⁊ dilec-
tio cuſtodia legũ illi⁹ ē. Cuſto-
ditio aũt legum cõſummatio
īcorruptionis eſt: incorruptio
aũt facit eſſe ꝓximũ deo. Cõcu-
piſcētia itaqȝ ſapiencie deducet
ad regnũ perpetuũ. Si ergo de-
lectamini ſedibȝ et ſceptris o re-
ges ꝑpli: diligite ſapienciã ut ī
perpetuũ regnetis. Diligite lu-
men ſapiencie: omnes qui p̄eſ-
tis ꝑplis. Quid eſt aũt ſapiētia
et quēadmodũ facta ſit referã
⁊ non abſcondam a vobis ſa-
cramenta dei: ſed ab inicio na-
tiuitatis īueſtigabo: et ponã ī
lucem ſciēciã illius. ⁊ non p̄te-
ribo veritatē: neqȝ cum īuidia

FAC-SIMILE OF A PORTION OF THE BIBLE OF THIRTY-SIX LINES.

Thousands of errors crept into the earlier editions, as there were no authorized revisers. The parable of the vineyard was printed in one edition as the "parable of the vinegar;" the Breeches Bible is so called because in Genesis, where our first parents are said to have sewed fig-leaves together, it reads "they sewed themselves breeches;" and one edition was printed in which there appeared "thou shalt commit adultery." Bibles were scarce up to the beginning of this century, and many of them badly printed. The spiritual destitution which existed in Wales in 1787 led to the printing of an edition of the Welsh Bible by the Society for Promoting Christian Knowledge. But still people were generally destitute of Bibles, and in 1803 the condition of affairs led to the formation of a society which should do nothing except print and circulate Bibles. The British and Foreign Bible Society has ever since 1804 been engaged in this work, and its example has been imitated all over the Christian world. Special editions for special uses are printed for other publishers, but for Great Britain and its colonies this has been for many years the chief source of production. The book is better printed and is much more accurate than it used to be.

One of the very first works engaged in by those who sustained the press at Cambridge, Mass., was the printing of a Bible in the Indian language, commonly known as Eliot's Indian Bible. The New Testament was completed in 1658, and in 1663 the rest of the Scriptures was finished. This book, which it is said can be read only by one person, from the scarcity of copies and the historical circumstances connected with it sells at the highest rate of any book printed in America, or from two to five times its weight in gold, according to condition. The first English edition was brought out stealthily by Kneeland & Green, two Boston printers, in 1752, with the London imprint of "Mark Baskett, Printer to the King's Most Excellent Majesty." William Bradford, while living in Philadelphia, proposed to bring out an edition, but it was never done. The first Philadelphia issue was that of Robert Aitken, in 1782. This book is also much sought after. A German Bible was brought out at Germantown, Pa., in 1743, and several editions of the New Testament in German were printed before the Revolution. From 1790 there has been a continuous succession of Bibles from the press of New York, Philadelphia and Boston. Mathew Carey printed a Douay Bible in 1790, and his publication of Bibles was larger, perhaps, than that of any other person of his time. He kept one or two sizes standing in type. Hugh Gaine had one size in type in New York. Thomas made many Bibles in Worcester, Mass. It was a common plan for eight, ten or a dozen booksellers to unite together to pay the expense of an edition, then dividing the sheets among themselves and having them bound as they were needed. The example of Great Britain in establishing a Bible Society was not lost here, and in 1816 an American one was begun in New York, Daniel Fanshaw being the printer, and his office and theirs being in Sloat lane, just where the Cotton Exchange now is. A few years after it was removed to Nassau street, Mr. Fanshaw remaining the printer till about 1844. In 1852 it put up the large building it now occupies in Ninth street, all above the ground floor being devoted to the manufacture of Bibles and Testaments. The text that the society is using depends upon a printer. Their standard edition of 1831 followed Fanshaw's edition of 1818, and he again followed the text of the first stereotyped Bible in America, the one brought out by the Bruces, which was a composite text, made up from several Old-World Bibles. During its existence the American Bible Society has manufactured more than $25,000,000 worth of Bibles. It now issues the book in many languages. Very little is done elsewhere in the United States in cheap editions of the ordinary version. Family Bibles are largely printed in Philadelphia, and to some extent in other places. The Revised Edition was reprinted in America by a number of publishers when it first came out, but large sales are no longer effected.

The printing of Bibles is something that requires great care. The first necessity is a good text. In this respect, we are assured by the highest authorities, the English editions are superior to the American, as the work of the English Bible Society is all farmed out, and the slightest error causes the rejection of plates or printed sheets. It should be noted, however, that many words are spelled and compounded in the issues of the authorized English printers of to-day in a way which is not used elsewhere in England or America. It has become almost a matter of superstition to avoid altering even unessential details. Among such words may be mentioned "plaister," "musick," "plumbline," "pressfat," "morter" and "pourtray." Some proper names are used differently from the ordinary usage, as Cesar. There are no quotation marks, and no Italic to signify emphasis. This can be shown more plainly by a quotation from Luke ix. 19, the modern form being given directly after the other:

They answering said, John the Baptist; but some *say*, Elias; and others *say*, that one of the old prophets is risen again.

They answering said: "John the Baptist; but some [say], Elias; and others [say] that one of the old prophets is risen again."

Old forms of words are constantly used, such as "glister" for "glitter," "which" for "who," "his" for "its." These various reasons, together with the fact that many persons have an excellent textual memory of its contents, and that others have a superstitious reverence for the paper, the ink and the binding—the externals of the Holy Book, instead of its message and meaning—all so tend that he would be a very bold printer who should resolve to make any changes, if he were publishing on his own account, and he would not be allowed to do so if the book were issued on another person's order. Forty years ago the American Bible Society repunctuated their standard edition, making other changes that ought really to have been done, although conservatively. The plates had been cast and some copies circulated, when a noted divine had his attention called to the alterations. He published a pamphlet on the subject, called the trustees of the society together, and appealed to the members. The result was that the plates were altered back again at a very considerable expense, and the society once more used Fanshaw's edition of 1818 as their model.

Bible Text.—A large size of type, otherwise known as great primer; so called because it was largely used in printing the Bible.

Bibliognoste (Fr.).—The Abbé Rive, librarian to the Duc de la Vallière, defines this as one versed in a knowledge of title-pages, colophons, editions, the places where books were printed, the presses whence issued, and all other minutiæ concerning a book.

Bibliognosy.—Knowledge of books.

Bibliographer, Bibliographe (Fr.), **Bibliograph** (Ger.), **Bibliograaf** (Dutch).—One acquainted with books, their authors, subjects, editions and history. A describer of books and other literary details.

Bibliography.—A systematic description of books and manuscripts, with notices of different editions, time when printed, published prices, reputed or actual value, &c. The French term bibliographie was long used to imply only an acquaintance with ancient writings and the art of deciphering them. Gradually the meaning of the term changed, until it now signifies the science of books, regarded simply as such. Thus limited, it excludes all consideration either of the literary merits of a work, or of the importance or interest of the subjects which the author treats of, or of the truth or value of his statements, opinions or speculations. To a certain extent this knowledge is possessed by all who make, read, sell or buy books, but there are those who have acquired extensive information upon this topic, and it is to these alone that the term bibliographer properly applies. In Germany, Italy, France, England and the United States many works have been published in general or special bibliography, and a mere catalogue of them would fill many volumes. Catalogues of books are the most common. They are arranged according to subjects or alphabetically, either plan having disadvantages, and it is besides very difficult to catalogue a book correctly. Among other things that should be noted are size, place of publication, date of issue, name of author, name of publisher, title and subject. Under the last head a question would come up as to where the Beggar's Opera should be classed, under Drama or Music. Should King Philip's War be under New England or Indian, and should Heroes of Albany be under Albany or Rebellion? Many titles are very ambiguous, and it is often hard to select the leading word. In the British Museum books are classified under their first principal word, but under this rule the Select Works of Aristophanes would be under Select and not under Aristophanes. A club in Boston bought a library, and the cataloguer arranged the books according to this theory. As a result nearly half the library was under Works, as Works of John Adams, Works of Gouverneur Morris, and so on. To determine the size the folding of the sheets must be examined, and to discover the author's name a search of a day is sometimes necessary. Many attempts have been made at surveys of the literature of particular countries, places, persons, or sciences and arts. Some of them are very elaborate, while others are confined to a single volume. Recent instances in printing are Hildeburn's Bibliography of the Works Printed in Pennsylvania before 1784, and Ford's Franklin Bibliography. The Boston Public Library has done considerable work in this line. There are also bibliographies of books which are rare or difficult to find.

The principal works of this kind upon printing are Renouard's, Panzer's, Ames's, Brunet's, Dibdin's, Mattaire's, and Bigmore and Wyman's. The last is the most convenient for speedy consultation. The best collection in this country of books on printing which is adequately indexed is that in the New York State Library. The report of the Commissioner of Education of the United States for the year 1876 upon libraries is filled with information concerning libraries and their management, and has a list of the most approved modern bibliographies. Early books can only be studied by those who have a competent knowledge of Latin; next in importance come German and French.

Bibliomania signifies a passion for possessing curious books. The true bibliomaniac is governed in the purchase of books less by the value of their contents than by some other consideration affecting them. To be valuable in his eyes they must relate to particular subjects, be embellished curiously, or have something remarkable in their history. Among those that are thus sought for are all books printed before 1480; all books except trite religious ones printed before 1500; block books; the productions of the Elzevirs and the Aldi; Caxton's works; first editions of authors, like Boccaccio's Decameron, and the single plays and first folio of Shakespeare; books from celebrated presses, like those of Bodoni and Ibarra; the first books printed in particular towns, like Bradford's in New York and Philadelphia, and Day's or Green's in Cambridge; a set of an author's works, like Ruskin's; books with defects or errors, like the Vinegar Bible or the Breeches Bible; those which have been bound by celebrated binders, like Payne; that have had artistic owners, like Grolier; that have a book-plate or the signature of some distinguished person, such as Burns or Washington or Goethe, and in fact everything that lends an interest to the volume apart from its reading matter. Particular works rise in value to a very great height. There are many books known to bibliographers which are worth over a thousand dollars; one was sold in New York for $8,000 twelve years ago and has since been resold for $15,000, and Quaritch displayed in New York in 1890 the Psalter of 1457 of Fust and Schoeffer, for which he asked $26,250. The highest price yet reached for an American book is $1,650. To be worth a large sum in the bibliomaniac's sense the book must have something about it which would make it remarkable in his eyes and it must then be scarce. The book written by Napoleon when he was a lieutenant of artillery is an illustration. There are many collectors who are anxious to get everything they can concerning him; the book was of no value when published, the edition was small, and the work not being in demand most of the copies were probably thrown away. It is now consequently very scarce, so if a copy turns up it is worth ten times the value of his nephew's Vie de César, although this has intrinsic merits, has valuable historical matter, is much larger and is well printed. Gathering many editions of the same work has always had an attraction for the bibliomaniac, while to make a complete collection of the works of a voluminous writer or the whole number of volumes issued by a single printer is likewise very seductive. It is supposed that there are about two hundred books published by the Elzevirs. A collector attempts to gather them all and is at first pleased with the ease with which he moves on. Many can be bought for about a dollar or two and nearly any volume for $5. But after he gets beyond one hundred and fifty it is impossible to obtain the rest. He knows the names of the books he requires, but a year will go by without showing him more than three or four, no matter how assiduous may be his search or how long his purse. Of some there may not be more than two or three in existence; of the scarcest perhaps only one; those that have eight or ten copies may all be in public or corporate libraries or in the hands of men who will not sell; and the collector's only chance on these is when a library is dispersed by the death of its owner. Books were formerly printed in editions of a few hundred. War, fire, mice, water and ignorance speedily destroyed them. Those that are preserved are in public, society or college libraries, and their number is continually becoming smaller. There are not many copies of the first folio Shakespeare, yet when Edwin Forrest's house caught fire in Philadelphia one of these books was there. The Chicago Historical Society Library has twice been burned out; there were undoubtedly many unique books on its shelves each time, and these have now totally disappeared. The finest collection of materials for Western history, that of James McBride, of Hamilton, Ohio, went to the paper-mill. The book which George H. Moore esteems as the

THE BIBLIOMANIAC.—ENGRAVING FROM THE SHIP OF FOOLS.

first one from Bradford's press in New York is lost. It is a curious fact that cheap books issued in large editions are among the hardest to find when some time has elapsed. Thus the New England Primer is very difficult to obtain, while larger New England books, which were not published in hundreds where this was in thousands, can very easily be obtained. An early edition of Mother Goose's Melodies will bring its weight in gold. Illustrated books, those upon vellum, prohibited books, works upon curious materials and obscene books have each their collectors. Tall copies are greatly desired. Until lately there was no close uniformity in the sizes of sheets. Before the Fourdrinier machine came into use the sheets of paper frequently varied an inch or an inch and a half. After being printed those that were of one size were picked out and bound together. If the work afterwards became sought for this large copy looked much finer and gave a better opportunity for the binder to show his skill. Most books were and are yet cropped too close. In America the first editions of Hawthorne, Lowell, Longfellow and other writers are now sought for, as are the first productions of the New England towns, New York, Philadelphia and Ephrata. Other American cities and neighborhoods may have a few collectors, but not enough to raise the price of the books materially. For instance, the earliest productions of Cincinnati lie unnoticed there on the stalls, and New York books after the Revolution up to 1825 are still unregarded. Yet there can be no doubt that some day, when these books are far more difficult to get than they are now, collectors will endeavor in vain to obtain sets. In England Caxton is the summit of the bibliomaniac's desire. He published some ninety books, which will bring anywhere from £20 to £300 each, according to condition and the value of the book itself. In New York and Philadelphia Bradford books are sought for. By a curious succession of adventures it happened that he began the art in both cities—in Philadelphia in 1685 and in New York in 1693. Thus he appeals to book-buyers in both places. Proficiency as a book-collector is only to be attained by buying largely, by attending auctions and frequenting book-stores, by comparisons of catalogues and by examination of the books themselves. Some collectors buy large lots and then weed out what they do not desire. Brinley, who had the most valuable American library, traveled from town to town with a light wagon and purchased the contents of garrets; much was bought in lots that he did not examine. Some of the books for which he did not pay more than five or ten cents have since sold for nearly as many hundred dollars. Well-selected books or pamphlets keep continually increasing in price.

Bibliopegy.—The art of bookbinding.

Bibliophile.—A lover of books.

Bibliopole or **Bibliopolist.**—A bookseller who is well versed in his own occupation.

Bibliotaphe.—One who buries his books by keeping them under lock and key, or framing them in glass-cases.

Bibliotheca (Lat.), **Bibliothek** (Ger.), **Bibliothèque** (Fr.).—A library; also used to designate a collection of books on a special topic, as Bibliotheca Scoto-Celtica, a catalogue of Gaelic books.

Bibliothecarius (Lat.), **Bibliothècaire** (Fr.), **Bibliothekar** (Ger.).—A librarian.

Bidwell, George H., who wrote an excellent book upon imposition, the best which has yet appeared, and a Ready Reckoner, committed suicide in New Haven, Conn., September 6, 1885. He was a member of the firm of Holmes & Co., of that city, but had for many years been employed in New York. He was about sixty-five years of age.

Biette (Ital.).—Sidesticks and footsticks; beveled furniture.

Big Bodies.—Types cast in molds that have not been accurately set, and are a little too large.

Bill.—1. A term for a broadside or poster. 2. A record of work done, or a charge for it.

Bill of Type.—An old expression, not now used in America, to indicate the type cast at one time, with its proportions all perfect. This used to be 800 pounds. To this there were 3,000 lower-case m's. A more common plan in America is to cast 600 or 1,200 pounds, as these figures allow of easy subdivision, so that a font of 100, 150, 200, 300 or 400 pounds can be quickly made up. Printers when ordering pay no attention to these weights, but send for what they need. The quantity of type of each kind made is regulated by experience. Thus in England more u's are required than here, as the u is retained in many words like honour, favour or behaviour, and more semi-colons and hyphens are employed, from a difference in punctuation and hyphenizing. Particular authors run to sorts. In Scotland type is apportioned by weight and not by number. The following is a bill of type in the English language:

a	8,500	A	600	A	300
b	1,600	B	400	B	200
c	3,000	C	500	C	250
d	4,400	D	500	D	250
e	12,000	E	600	E	300
f	2,500	F	400	F	200
g	1,700	G	400	G	200
h	6,400	H	400	H	200
i	8,000	I	800	I	400
j	400	J	300	J	150
k	800	K	300	K	150
l	4,000	L	500	L	250
m	3,000	M	400	M	200
n	8,000	N	400	N	200
o	8,000	O	400	O	200
p	1,700	P	400	P	200
q	500	Q	180	Q	90
r	6,200	R	400	R	200
s	8,000	S	500	S	250
t	9,000	T	650	T	320
u	3,400	U	300	U	150
v	1,200	V	300	V	150
w	2,000	W	400	W	200
x	400	X	180	X	90
y	2,000	Y	300	Y	150
z	200	Z	80	Z	40
ff	400	Æ	40	Æ	20
fi	500	Œ	30	Œ	15
fl	200	&	200	&	40
ffl	100	?	200	1	1,300
ffi	150	!	150	2	1,200
æ	100	*	100	3	1,100
œ	60	†	100	4	1,000
,	4,500	‡	100	5	1,000
;	800	‖	100	6	1,000
:	600	§	100	7	1,000
.	2,000	¶	60	8	1,000
-	1,000	[	150	9	1,000
'	700	(	300	0	1,300
Three-em space	18,000	Hair space			3,000
Four-em space	12,000	Em quads			2,500
Five-em space	8,000	En quads			5,000

There are, besides, accents. To a font of this size there are 200 grave à's, 250 acute é's, 200 circumflex â's and 200 circumflex ê's, while all the rest are 100 each. The Italic, as given by Hansard, is one-fifth of the Roman, while MacKellar gives as the proper proportion one-tenth. Large quadrats are extra, and weigh to a font of this size, or 800 pounds, about 80 pounds. In the capitals I is most numerously used, T the second, and E and A third. The same rule is found in the small capitals. The total number of letters as given by Hansard is 107,100 lower case, 1,510 double letters, 2,550 accents, 10,960 reference marks and punctuation marks, 10,900 figures, 5,331 small capitals, 21,420 Italic lower-case letters, 302 Italic double letters, 410 Italic points, 470 Italic accented letters and 2,132 Italic capitals. The spaces number 48,500. Thus the Roman embraces 149,011 characters, the Italic 24,734 characters, and the spaces 48,500. In all there are 222,245. It will be seen that the letter e in its various forms is a little less than 8 per cent. of the whole, but it forms 10 or 11 per cent. in actual use. In pica 255 average letters make a pound.

Billet Note.—A folded writing-paper, size 6 by 8 inches.

Bill-Heads.—A class of job-work by which a statement of account is presented to a debtor. There is, usually speaking, a displayed top, containing the name and business, with the date, and below these are ruled lines upon which the items of a bill can be placed. Flat cap, 14 by 17 inches, is the standard size, weighing from fourteen to eighteen pounds to the ream. Law blank cap, 13 by 16, and foolscap, 12 by 15, are sometimes used. Folio post, 17 by 22 inches, folded the narrow way, is sometimes employed for making odd sizes to which flat cap will not cut to advantage. Paper is cut into halves, quarters, sixths and eighths. Orders usually embrace some of two or three sizes. Most of the commoner bill-heads are now done on bill-head paper, bought ready ruled. It is much cheaper. A bill-head differs from a statement of account. The latter is sent every month for the balance remaining due. The bill-head is used for bills when immediate payment is expected, and of the two it is the more ornately printed.

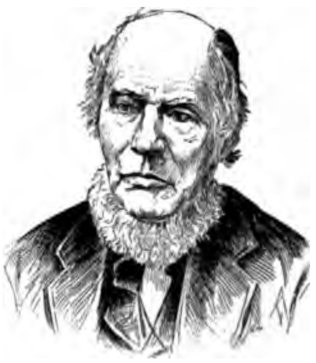
Bill-Posting.—To put up handbills, posters or placards upon walls or fences, or other conspicuous places, generally in the open air. Gutter-snipes are posted against the pavement at the edge of the gutter. No very clear definition can be given of the difference between a handbill and a poster, except that the latter is the larger. It is not a poster unless of considerable size. Forty years ago bills were posted in any vacant place, but to-day, from the necessity of obtaining permission to put them up, each bill-poster in every principal city owns his own fences and walls, having made arrangements with the proprietors of the grounds or their lessees. Before this was the case one gang of bill-posters would tear down the bills of any other firm that they thought interfered with their own, or would paste over them, and they were frequently obliged to maintain guards to prevent others from tearing theirs down. In 1890 one firm in New York paid $30,000 for rent. They have 500 stands or places where a number of bills can be exhibited at once, and 5,000 three-sheet bill-boards. Theatrical companies give tickets to shopkeepers for the privilege of keeping bill-boards in front of their places. The usual paper for posters is 28 by 42, double and triple this being the usual theatrical dimensions. But some run up to 24, 28 or 32 sheets. Most of the work is executed in the daytime, but there is also much done at night. A weekly paper has paid $17,000 for billing a single story, and $10,000 a year has been expended in one town year after year by a certain firm for its own work. The implements are a common whitewash brush and a pail of paste, made of flour and water. Occasionally ladders are required. With this method of advertising a good fence or blank wall becomes of great value. In London the proprietor of a large hotel in the West End obtained £800 cash in advance for the use of the hoarding for six months, its length being a little over a hundred feet.

Bills in Parliament.—A class of work which has a particular scale of prices in composition.

Bills of Fare may be on a single leaf or two, three or four pages of a note or letter sheet, or may even make a considerable pamphlet. They are on hard paper, moderately displayed, and often have blanks left so that new dishes can be added or figures changed. For some inns and restaurants they are changed daily; others only have new ones as old ones are used up. If articles are named in French care should be taken that the words are rightly spelled and the accents correct; but at the same time it must be remembered that this French is not standard French, but is full of incorrectly formed words. The languages should not be mixed. Nothing looks more ridiculous than "woodcock au beurre" or "tea à la reine." Occasionally French words must be used, because in cookery there may be no English equivalent, as in sauté or ragoût.

Bills of Lading are usually printed on folio post, 17 by 22 inches, six to a sheet.

Bind.—1. Furniture and rules are said to bind when, in locking up, the pressure which should be directed against the type falls upon them. Pieces of furniture can also bind against each other, as a foot-stick and sidestick. 2. To place a cover upon a book or pamphlet. See BOOKBINDING.



SAMUEL BINGHAM.

Binder.—A short term for a bookbinder, and also a term for the covers which are supplied for temporary use by publishers of periodicals.

Bindery.—A book-binding establishment.

Bingham, Samuel, the earliest extensive manufacturer of rollers in the United States, was born in Hanover, N. H., in 1789. He became an apprentice to the printing business in 1800, subsequently going to Albany, Philadelphia and New York. In the latter city he was employed by Daniel Fanshaw, who was one of the first to use composition rollers. Previous to this balls of skin, composition balls and skin rollers were in use, the latter only in a few places. In 1840 he was employed by Harper & Brothers, and in 1848 embarked in roller-making. In this he was very successful. He died in 1876 at the age of eighty-nine. The business is still carried on as Bingham, Daley & O'Hara.

Binny, Archibald, a Scotchman who went to Philadelphia, Pa., in 1795. He had been a printer, and knew something about type-founding. Becoming acquainted with James Ronaldson, a baker, who had been burned out and who was looking for a new opening, he easily induced him to embark in the business of letter-casting. They began in 1796 and were immediately successful. This was the first permanent foundry in the Union. Letter-casting had been previously practiced by Sauer, Mitchelson, Baine, Buel and Mappa, but none of these had taken permanent root. About 1811 Binny & Ronaldson devised an improvement on the ancient mold which greatly increased the facility of production, and they subsequently attempted to make a machine for rubbing type, which was unsuccessful. Mr. Binny retired from business in 1819, it afterwards being carried on by Mr. Ronaldson. From their foundry was issued the first American specimen book, that of 1812. Mr. Ronaldson was succeeded by L. Johnson & Co., and they by the later firm of MacKellar, Smiths & Jordan.

Birmingham, a thriving town in the centre of the coal region of Alabama, publishes three daily newspapers and eleven other periodicals, and has a number of independent printing-offices.

Bite.—Where two parts that should meet each other completely are prevented from doing so by the interposition of some thin substance; hence the light spot on a printed page occasioned by the frisket not being sufficiently cut out.

Biting, or biting-in, the expression applied to the action of acid upon the copper-plate that has been laid bare by the etching-needle.

Black-Leading.—In electrotyping, covering the surface of the page which is to be molded with black-lead and afterwards removing the excess. See ELECTROTYPING.

Black-Letter.—That type which most closely approaches the characters used at the beginning of printing, before the introduction of Roman.

This line is in Nonpareil Old Black.

Blacks.—1. When a space, quadrat or piece of furniture rises and is imprinted on the sheet; also used when wood-cuts and electrotypes are not sufficiently cleared out and the low parts are printed. 2. The name of an ink used in copper-plate printing, prepared from the charred husks of the grape and residue of the wine-press.

Blacksmith.—A poor workman. It is regarded as a very opprobrious epithet.

WILLIAM BLADES.

Blades, William, the most eminent of lately living British printers, was born at Clapham, England, on December 5, 1824, and received his education from the Rev. Charles Pritchard, now professor of astronomy in Oxford University, but then head master of Stockwell Grammar School, and afterwards of Clapham Grammar School. His father was Joseph Blades, a prosperous printer, and he entered his office while still much under age. His training was a very thorough one. Very early in life he manifested a great interest in Caxton and his work, and in 1858 he annotated his Governayle of Helthe, and the next year brought out Moral Prouerbes in fac-simile. All this time he was working upon a full and exhaustive account of Caxton's life, tracing him through early records and by his own printed works from the time he first began as a merchant down to the time of his death. Blades's work was entitled the Life and Typography of W. Caxton, England's First Printer, with Evidence of His Connection with Colard Mansion, the Printer at Bruges. It was in two volumes, quarto, with numerous plates, and was brought out in 1861–63. To do the subject justice all known copies of his works were consulted and compared, as there were frequently wide differences between different copies issued in the same year. His press had been a prolific one, and its productions were to be found in many houses of gentlemen in England and in the libraries on the Continent, but particularly in the greater English libraries. Much aid was derived from Henry Bradshaw, whose knowledge of early printed books was even then almost unequaled. A couple of years after this work was finished he compiled a Catalogue of the Books Printed by Caxton. In 1869 he issued a book on the Medals, Jettons and Tokens in Connection with Printing, and in 1870 a list of the Medals Struck by Order of the Corporation of London. In a work entitled Shakespeare and Typography he attempted to show that the great poet was himself familiar with the art preservative of all arts. A small work published by him in 1881 on the Enemies of Books attracted much attention, both on account of its matter and of the agreeable and racy manner in which his conclusions were stated. It was determined in 1887 to celebrate the fourth centennial of the introduction of printing in England, and in this Mr. Blades took a leading part. It proved highly successful. A public dinner was given to him shortly after in recognition of his services. He also contributed a multitude of articles to the press of England upon matters of interest in relation to typography. He differed from nearly all the writers on the beginning of printing who had preceded him, by having not only a knowledge of his subject as derived from books, but also a knowledge of the art itself, a most useful corrective in dealing with the matter, as it gave him a wider and a more thorough grasp. His library at Sutton, in Surrey, is described as being the finest collection on the subject of typography ever brought together by a private person. While writing upon the topics that interested him he did not neglect his business. This kept on steadily extending, his firm being known as that of Blades, East & Blades, and its work being of the best quality. His death happened at his house in Surrey on April 27, 1890, and he was buried on May 1, the day that would have completed the fiftieth year of his career as a printer. The cause of his death was angina pectoris. He had made preparations for celebrating his semi-centennial anniversary, and a medal had been prepared for it. He had a great love for music and attained proficiency in the art, both theoretically and as a vocalist. In his private character he was everything that was attractive.

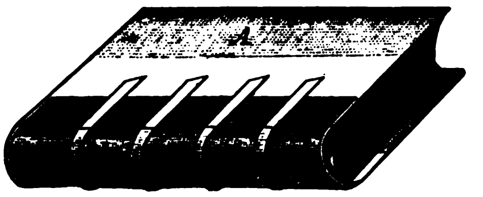
Blaew, Willem Jansen, the inventor of the press which bears his name, was a native of Amsterdam. He was brought up to joinery, and after serving his time went to Denmark, where, in the employment of Tycho Brahe, he made many mathematical instruments, as well as assisted Brahe in his astronomical observations. On his return to Amsterdam he began making globes, and acquired a great reputation through these and through his maps. His frequent attendance at printing-offices induced him at last to establish one, and in it he experienced the inconveniences of working with the original hand-press, which scarcely differed from the screw-press used in making wine. He caused nine improved presses to be made, each of which was named after one of the Muses. As their good points became known they were imitated, and their use spread from the Low Countries all over Europe. In this press it was unnecessary to turn the screw back, as that was accomplished by a spring. This press had perhaps the only improvement which was made between the time of Gutenberg and Stanhope, and remained in use for over two centuries. Blaew was born in 1571, and died in Amsterdam in 1638.

CYRENE H. BLAKELY.

Blakely, Cyrene H., president of the Typothetæ of Chicago, was born in East Berkshire, Vt., on May 22, 1837, his parents removing to Central New York while he was an infant. He entered the office of the Syracuse Star as a roller-boy at the age of eleven, working a year, and then returning to Vermont, where he completed his education at the Franklin Academy. He then finished the acquirement of his trade in the office of the Syracuse Journal, and in August, 1856, went West. On arriving at Chicago he obtained a situation in the office of the Evening Journal. In 1859 he went to Minnesota, and with his brother began the publication of the Post at Rochester in that State, the newspaper still being in existence. He enlisted at the outbreak of the war on July 1, 1861, as a private in Company K, Third Minnesota Infantry, and was soon promoted to first lieutenant, becoming the adjutant of his regiment. In May, 1863, he was commissioned captain and commissary of subsistence by the President. He was afterwards breveted major for meritorious services, and was mustered out in October, 1865, after four years of service. His accounts were settled by the auditing officers with a disallowance of $12.40 only, although he disbursed vast sums of money and millions of dollars of government stores passed through his hands. Believing that he was unjustly dealt with in the settlement, he has applied to the Treasury Department for a readjustment, and now hopes to obtain a clear balance-sheet from the government. After returning from the army he settled in Chicago, and with his brother started the Chicago Daily Evening Post in 1865. After four years of hard work as its business manager he sold his interest and returned to the job-printing business, in which he is now actively engaged. Upon the formation of the Chicago Typothetæ he was elected its president, and has since been re-elected at each annual meeting. He was one of those most active in organizing the United Typothetæ of America, being temporary chairman of the convention in his city in 1887, and presided at the banquet given to the members at its conclusion. The experiment of union among employing printers was then new and untried, but Mr. Blakely threw his whole spirit into the movement, which proved a great success.

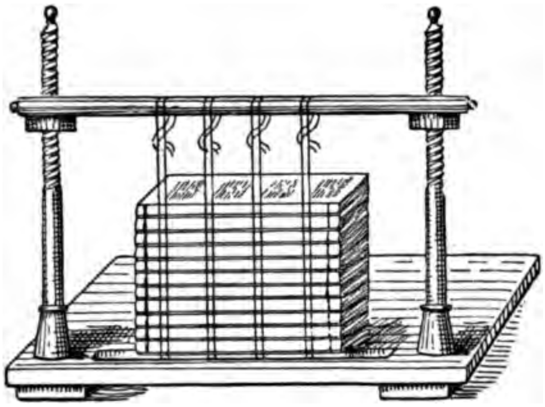
Blank.—When a hiatus occurs in a manuscript or in reprint it may either be left wholly blank, or asterisks, periods separated by spaces or quadrats, leaders, waved brass rule or metal dashes are used instead. It was a common and fashionable method in London, when Johnson reported the debates in Parliament for Cave, to indicate perfectly well-known persons by a letter and a dash. There was a possibility of a libel suit growing out of some of these reports, and they were also breaches of the privileges of Parliament. So Lord Chesterfield was indicated as L—— C——d, the Duke of Grafton by D—— of G——n and the king by K——. This practice has nearly died out, on account of the press being less restricted, but we occasionally see it. A blank is also the space between lines, when increased to more than a lead or two; at the head of chapters; at their end, or when room has been left for an author or lawyer to write something in, as is frequently seen in law cases.

Blank-Books.—The manufacture of blank-books constitutes a very important part of the business of some bookbinders and printers. In the last century all paper was rough and it was very rare indeed to have printed headings, while the ruling-machine had not yet been invented. When that was ready and paper became smooth certain firms devoted themselves almost entirely to the manufacture of blank-books, as they are called in America, or account-books, as they are styled in England. The paging-machine helped to lessen the cost, while the diminished price of paper, the practicability of using headings in lithography or with woodcuts or steel-engraving, and the general improvement of machinery have caused this work to be done almost entirely in houses which make a specialty of it. There are two classes. One is work done to order, for which general bookbinderies compete, and work intended for the public.



BLANK-BOOK.

It is evident that large blank-books, such as ledgers, must be made with good materials and strongly put together, as otherwise they would speedily become weak and the pages would tear loose. Ledgers and other large books of account frequently weigh from twenty to fifty pounds. The paper for these should be of linen with smooth surface and of considerable thickness, each sheet consisting of two leaves only, although one or two sheets may be nested inside of another to make a section. They should not be folded further than this, as the thickness and stiffness of the paper prevent the forwarding from being perfectly true and square. The Bank of England, which uses as large books as any corporation, has for its general books of account a page about two feet long. Before being bound, but after being ruled and the headings placed upon the pages, the sheets are each mounted upon muslin, so that it would be almost impossible to tear out a leaf or a portion of a leaf. In blank-book manufactories, after the sheets have been gathered and beaten or pressed, they are sewed to parchment bands, the number being governed by the size of the book. These bands make real projections. The glue used is strong, cloth reinforces the paper wherever it is likely to break away, and the covers and back are of great weight and solidity, the outside being in duck, russia leather or sheep. But the cheaper grades constitute the great bulk of the business. In these the leather is a skiver or a common low grade, dyed; the thickness is very much diminished and the quality of the paper lessened. In the cheapest kinds an imitation leather or stiff paper is used for covers, there is no attempt at rounding the backs, the paper is inferior in quality and the ruling is done very rapidly. A wide sheet after being passed through the ruling-machine is cut lengthwise, and these strips are used to make a book preposterously long for its width. After it is completed it is put into the cutting-machine and two, three or four books made from it. The varieties of blank-books are very great. A partial list comprises the following:



BLANK-BOOK SEWING.

Address-books, bank-books, bankers' cases, bill-books, blotters, books of designs, buyers' price-books, card albums, cash-books, check-books, collection-books; composition, exercise and manuscript books; cotton-weight books, day-books, diaries, drawing-books, engineers' field-books, fern and moss albums, flap memorandums, journals, grocers' and butchers' order-books, herbariums, hotel registers, indexes, invoice-books, ledgers, letter-copying books, lumber and log tally-books, manifold-books, memorandum-books, miniature blanks, milk-books, money receipts, notes, drafts and receipts, note-books, order-books, package receipts, pass-books, pencil-books, perpetual diaries, pocket ledgers, portfolios, receiving and discharging books, rent receipts, renewable memorandums, reporters' note-books, roll-books, salesmen's order-books, scrap-books, scratch-books, shipping receipts, shopping-lists, tally-books, travelers' ledgers, trial-balance books, tuck memorandums, two-third books, visiting-books, writing-books and workmen's time-books.

Besides these there are many special forms used in portions of the country, and not elsewhere, as in Pennsylvania, where workmen are largely paid at company stores, or as in some manufacturing establishments, where matters must be recorded in an independent but compact form. There are, for instance, subscription and advertising books for newspapers and attendance records in schools. Books of the first class should have a smooth, firm paper, thick and good enough to erase a word once or twice and then to write over the place again. Bookkeepers differ in respect to the degree of smoothness which is desirable, some liking that which is as polished as glass and others preferring a slight degree of roughness. They should be well forwarded, the covers strong and well made, and if of great size with bosses at the corners, so that they may be moved more easily and suffer less injury from friction. Lines in ruling should end in other lines where practicable. The book should open easily and lie flat without straining. A practice has long existed of selling books by the quire, but as few purchasers ever counted the number of leaves manufacturers who were closely pressed found it expedient to lessen the number of sheets to their so-called quire until it became of eighteen, sixteen, fifteen or even fourteen sheets. The confusion arising from this was so great, and the opportunity for dishonesty by unscrupulous manufacturers and dealers so easy, that a few years ago several leading houses determined to use none but standard quires of twenty-four or twenty-five sheets, and this reformation has made great progress since. The illustrations herewith show books that are being sewed, the work being firmer and stronger than in ordinary books, and a blank-book, with its parchment bands.

Blank Line.—A line in which there is no letter which prints.

Blank Page.—Any page of a form on which there is no printing.

Blank Tables.—Tables in which only the headings are printed, leaving the columns to be filled with the pen. The term is also applied to tables in which the headings and brass rules have all been set, but the figures are left blank. When they arrive the quadrats are taken out and the metal figures inserted. This is done in many newspaper offices on election night, and is very convenient, as the compositor is not obliged to lose time in setting the heads.

Blanket.—Any yielding substance used between the type and the impression plate or cylinder to soften or render the pressure even. It may be of paper, cloth or india-rubber. When of the former, a few sheets only of hard paper being used, it is known as hard packing; when of flannel, broadcloth, many sheets of soft paper, or india-rubber, it constitutes soft packing.

Blanks.—1. The general term for the white spaces left by quadrats, reglets, slugs and quotations. The most minute ones are spaces, but the word is rarely or never used concerning them. Next come leads. These have been cast down to the fourteenth of a pica, or the eighty-fourth of an inch. They are also made twelve, ten, nine, eight, seven, six, five, four and three to pica, and slugs are cast to nonpareil and pica, and would be cast to any intermediate sizes did anyone desire them. The most used leads are six to pica, and indeed they exceed, three to one, all others put together. Pica and nonpareil slugs are in great demand in jobbing. In selecting them care should be taken that the burr is rubbed off. Great-primer and two-line pica slugs are also in use. In some of the typesetting machines slugs are used to fill out the lines, being cut accurately to so many ems. Beyond this come in the quotations, different in length and width, three pica ems by four, and metal furniture, which is as wide as twelve-line pica and as long as the founders can cast them. There are two kinds of the latter; one is hollow, having only enough bars across to sustain the pressure of the lock-up, and the other is made like a capital T turned on its side and having an equally long transverse bar at each end. Besides these there are reglets and wooden furniture, now made with great exactness, in pearl, nonpareil, minion, brevier, and so on, up to double pica, and beyond this by intervals till they are two or three inches wide. Wooden furniture is much cheaper than metal, and if it could be kept perfectly dry and secure from warping would be used still more largely than it is now. It is not considered good policy to fill a blank page in a book form with wood. Quadrats are the best material, but from the time that it takes to set a page of them and from the fact that it would empty two or three boxes to do it this method is little employed, and quotations or metal furniture are used instead. With the former, particularly if they have been used some time, it is not a bad plan to put a lead or slug between each line, as they get out of shape after a time. It will not do to make a page of leads or small slugs, nor of reglet. They are too spongy, too apt to give. In all cases where metal can be used cast in large pieces it should so be employed. The only exception is in the case of quadrats.

Blanks are used in books at the beginning and end of chapters; before and after subdivisions, such as Book I. or Book II.; between verses in poetry and before and after them; where the subject changes more than would be noticed by a simple paragraph; before notes; at the beginning and end of quotations, but not always, and in many other cases. After the page heading there is usually a blank line; there is also one at the foot of each page, except where the signature mark is, and each chapter heading and other prominent heading have one beneath, unless the book is very much condensed. Much depends in a title-page upon the proper disposition of the blanks. These ought to be spread with some evenness between the prominent lines, the catch-lines having less on either side of them than the others. A larger blank is just before the imprint, and another one in advance of the author's name and title. The length of a page for a new book ought to be longer where the folio or head of the page makes a very short line, leaving the rest blank, than where it is a full line.

Newspapers have no blanks, except leads and break lines. After a head a lead or two, after a dash the same, seems to be the rule; but in advertisements there are sometimes long blanks. These are always of quadrats, and never of leads or slugs. In jobs most large work is spaced out with nonpareil and pica reglets, because they alone are of sufficient length, but small work employs leads, quadrats and slugs. It is false economy to keep the workman on a short supply of these slugs and leads. Three thousand dollars' worth of book and job type in an office will not weigh more than four thousand pounds. To lead all this at once would take not more than eight hundred pounds of leads, which, at twenty cents a pound, would cost $160.

2. Blank pages or spaces are sometimes spoken of in this way.

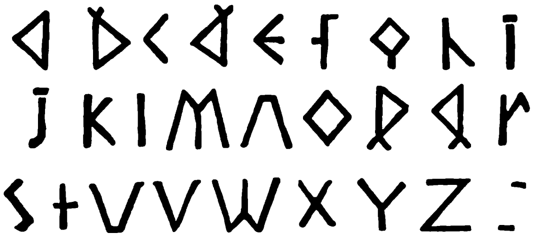
Blatt, das (Ger.).—The leaf.

Bleed.—When a book has been cut down so that the knife has touched the print, or nearly so, it is said to bleed.

Blind Blocked.—Lettering on book-covers not inked nor gilt—simply impressed.

Blind P.—In printing, a paragraph mark (¶); so called from the loop of the P being closed. Caspar gives this, but it is not known in New York.

Blind, Printing for the.—Until the year 1784 blind persons were obliged to depend upon those who saw for all their knowledge of books or newspapers. There was no method by which anyone thus afflicted, no matter how high in station, could acquire information except by oral instruction. The isolation of most blind people from the intellectual and religious life of their age was complete. In that year the Abbé Valentin Haüy printed embossed characters upon paper, and found that the pupils in the school he conducted in Paris, the Royal Institution for Young Blind Persons, could read the letters thus impressed. This was the first school in the world for the instruction of those who could not see. Since his time there have been a great number of theories promulgated as to the methods by which reading can most easily be learned. Most of the inventors have succeeded in finding schools to take up their plans, and to make use of books printed in accordance with them. Each of these theories depends upon the sense of touch. The more angular or marked the characters are the more easily they can be read.



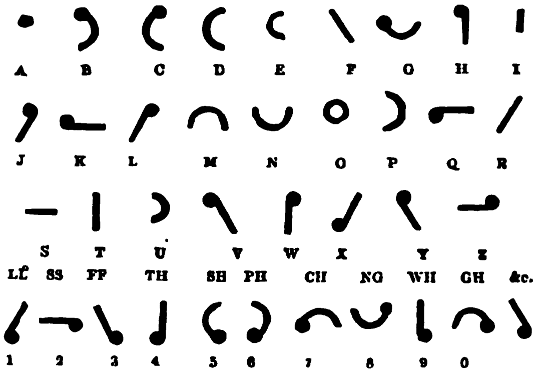
GALL'S ALPHABET FOR THE BLIND.

ABCDEFGHIJKLMNO
PQRSTUVWXYZ&.
1234567890.:;._!?()

FRY'S ALPHABET FOR THE BLIND.

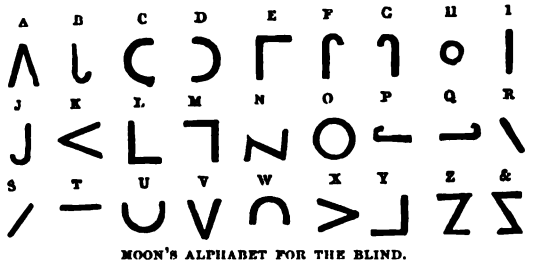
But many of the common letters vary so little from others that, however large they might be printed or however deeply they were stamped in the paper, they could be read very slowly even by persons of the most delicate touch. Small letters like e and c are not to be distinguished apart. This defect, together with the fact that alphabetic printing would require the pupil to acquire knowledge of more than a hundred letters if the font were to approximate in size that used by a printer, led a number of persons to devise new alphabets which should bear no resemblance to the Roman, and in which the relief could be indicated still more markedly. Carried to its full extent, this would be a system of points, as ·.· : :: .·. .. ·.·. An objection at once urged against this was that it bore no resemblance to the letters used by a person possessed of sight, and that if one of these lost his vision he must devote a long time to learning the new system, while by the use of a Roman alphabet he could at once begin reading, although slowly.

Before Haüy's day some desultory attempts had been made to devise raised alphabets which could be put together and from which instruction could be derived. The first essay was with the Illyrian or Slavonian alphabet, which was preferred, as it was thought that its square characters could be more easily read. They were afterwards abandoned, as not offering greater advantages than the common letters. Movable characters were next invented, which were placed on small tablets of wood, and were made to slide in grooves, on a similar plan to some of the toys which are used to induce children to learn their letters. It was with similar letters that Usher, Archbishop of Armagh, was taught by his two aunts, who were both blind, but this process was found defective in teaching blind persons. Movable leaden characters were afterwards cast for the use of the blind by Pierre Moreau, a notary of Paris; but the work was attended with difficulties and expenses which he was not prepared to encounter. Large pin-cushions were also brought into use for the blind, on which the characters were figured with inverted needles. The relief caused by the heads of pins would have been better. Various other attempts were made in wood and metal till the time of Haüy.



LUCAS'S ALPHABET FOR THE BLIND.

In 1832 the Society of Arts of Scotland offered a gold medal of the value of twenty sovereigns for the best alphabet and method of printing for the use of the blind. Twenty-one alphabets were submitted to the committee appointed for the occasion, fourteen for competition and seven for non-competition. Each was subsequently shown to be defective, although there were also merits. The character which the French schools had adopted was an upright script, widened to make it more obvious to the touch, as was falsely thought. Two alphabets were also employed, one of capitals and the other of small letters. The wide and complicated form of the script letters detained the finger in tracing their shape, and the acquisition of fifty-two letters instead of the alphabet doubled the amount of time required to become familiar with them, to say nothing of the complicated mental operations to be carried on at the same



MOON'S ALPHABET FOR THE BLIND.

time by the reader. James Gall of Edinburgh had been for several years before this competition engaged in the cause of printing for the blind. He adopted a modification of the Roman alphabet, in which he excluded curves and circles and substituted straight lines and angles. He also abolished the capital letters and thus was able to reduce the number of characters to be acquired to twenty-six. In these he printed several preparatory books, which were more compact than the original French alphabet.

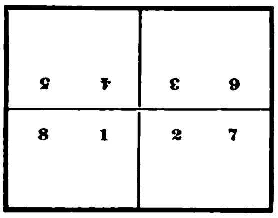
Kneass, a blind man and writer on this subject, classifies the arbitrary systems as those of Lucas, Frere, Moon, Braille and Carton; the alphabetic systems as those of Alston, Alston modified, the American and the French modified. Besides these there is the arbitrary one of Wait. A marked defect in all of the plans so far brought out consists in the great space which is required. As compendious a system as any is that form of the Roman alphabet which was invented by Dr. S. G. Howe of Boston. It requires eight large volumes to print the Scriptures. This great magnitude increases the cost of books for the blind very much, as they must, from the nature of the case, be issued in small editions.

The character which the Scotch society thought best of was the Roman letter of Dr. Fry, and to him they awarded their prize. Lucas's system was called a stenographic one. At first sight it appears a very valuable one, as the characters are reduced to one or two marks at the most, and it is also such a character as can be easily written by a blind person. It is plain to be seen that the phonographic signs of Pitman, then recently invented, gave the motive for this type. The alphabet is composed of thirteen simple characters and thirteen formed from the roots of them, with a crotchet-head to each. There are ten double letters from the same roots, distinguished also by the crotchet-head; these represent the ten figures. The letters can be put together very compactly. Frere's is another stenographic character, of twenty-nine signs, forming four classes. The words are spelled phonetically. Moon's is another system in which the common alphabet is simplified, but it presents the appearance of a stenographic method, as parts of the letters are arbitrarily left out.

The most perfect pupil under either of these systems can by no means approximate the speed in reading of a seeing person. To read rapidly requires sensitive fingers, great quickness in guessing at the remainder of a word of which a portion has been read, and constant practice. Unfortunately, the fingers of few blind persons are unhardened by toil, and a few months or weeks of steady work deprives even good readers of a portion of their skill. The inability of those intellectually gifted to obtain new books is another serious drawback to the blind.

The conclusions at which Mr. Kneass arrives are that the type must resemble as much as possible that in ordinary use among those who have eyesight, so that the blind scholar, in learning to read, may have every possible help from his remembrance of letters and words he may formerly have seen, but which must now be deciphered by his fingers, and so that he may derive help in reading from anyone who understands an ordinary book. The words must be correctly spelled in full, in order that when the blind man learns to write he may do so properly, and so that others can read what he has expressed. The raised characters must be sharp, clear and well defined, that the finger hardened by long work and the keen touch of the little child may equally be able to grasp their significance.

Printing from these sharp characters, so as to raise a relief on the opposite side of the paper from that which the type touches, is not very difficult, but it cannot be wholly conducted like other letter-press printing. It can be done either on a hand-press, cylinder-press or jobber. The latter will usually be too small, and more impression can be given on a cylinder than on a hand-press. If on the latter the bar should not be pulled home on the first impression, for there is great danger of smashing the characters. The paper should be thick and tenacious, and should be wet, as it will yield more easily. Flimsy wood-pulp paper will not answer. The impression should be carefully made ready, so that the letters may force up the paper to the required height. These letters are not reversed letters, as common types are, but exactly as they will look when printed. The forms are imposed differently from ordinary ones. In an eight the two forms are as in the margin. The outside form must always be imposed as is the inside one in other printing.



Blind Tooled.—In bookbinding, when the tools are impressed upon the leather without being gilt they are said to be blind or blank. In America working bookbinders generally use the term antique.

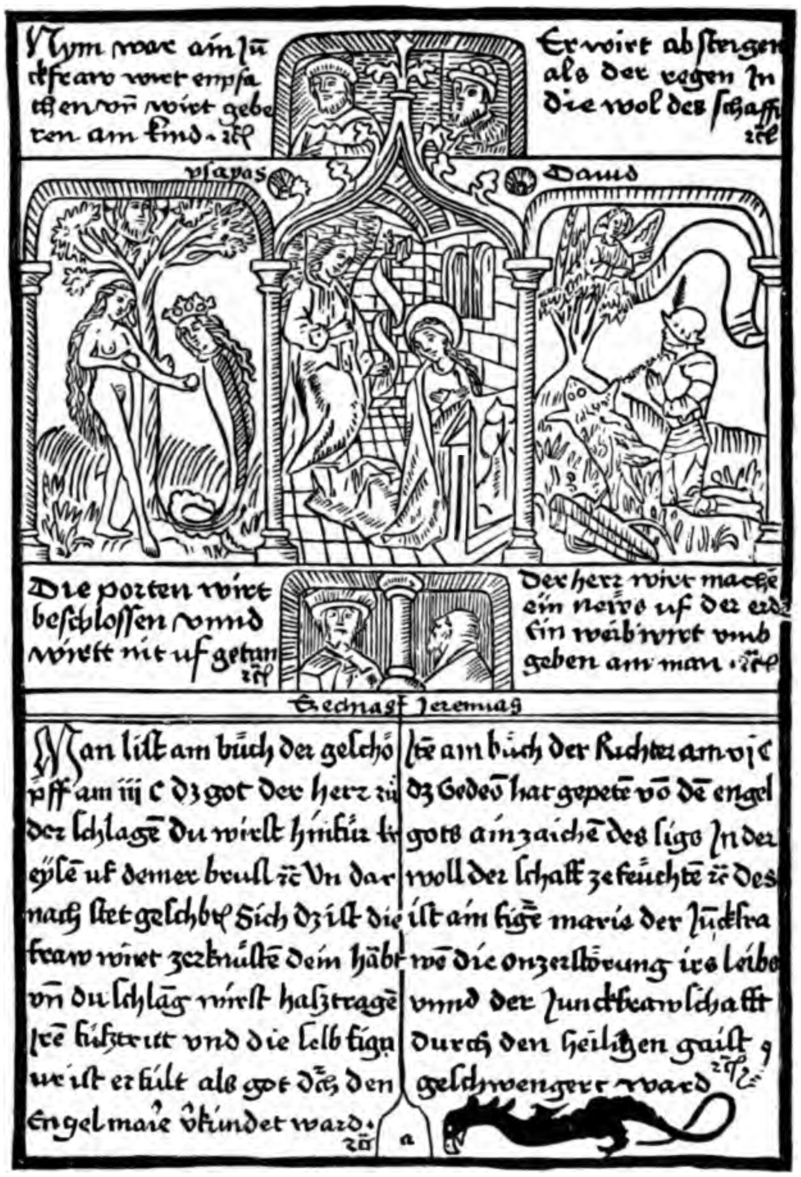
Bloccare (Ital.).—To turn letters. The turned letters are blocco.

Block.—1. The wood or metal from which a tint or solid mass of color is printed is thus called in England. 2. A term in general use applied to wood-cuts, electrotypes or zinc-plates.—*Jacobi.*

Block-Book.—An expression generally applied to the books which were engraved upon wood just before and just after the invention of printing. As is pointed out elsewhere, all the steps which led to typography and which constitute the printing art were discovered before the time of Gutenberg and Koster, with the exception of movable types and the way to cast them. Playing-cards were probably first painted and then stenciled, but a process for printing them was known considerably before the middle of the fifteenth century, which is the date usually assigned to the invention of printing. The first rude attempts at making books mechanically were for the purpose of producing religious works. It does not seem probable that printer's ink was widely known, if at all, in the year 1400, but within the next quarter of a century it was somewhat used.

Thus provided with something that would not wash off, and that gave an intense black, the makers of the block-books had it in their power to issue publications that presented a very much more attractive appearance than they had done before that time. Pictures of sacred personages, either with or without words, were very largely produced before Gutenberg's invention. They were of many sizes, some being no larger than a playing-card and others of quarto dimensions. Generally speaking, they were colored after the printing was done. In many the method was by painting, but later ones show that they were stenciled. As works of art they may be compared with the cheap colored lithographs of the period between 1820 and 1840, but with the defects and excellences of wood-engraving. The lines are coarse and do not come closely together. Twenty to an inch is probably as near as they were ever cut, ordinarily not being over seven or eight, and the object of having the engraving made at all seems to have been to give a definite line for stenciling. The earliest of these image-prints is believed to have been of St. Christopher carrying the infant Saviour across a river. It is 8½ by 11¼ inches, and was executed in 1423, or at least that date is upon the print. Another early print is the Annunciation, found in the same book in which the St. Christopher was discovered. A peculiarity in this is a large mass of black in the centre, left there apparently to lessen the work of the colorist, who would otherwise have been compelled to paint it. This method of leaving portions of the wood without touching the graver to them was practiced by nearly all the early printers, among others by Caxton. In the image-print last mentioned the Virgin is represented without any inner garment. This was evidently designed to be painted in. What the early engravers of wood could not do with the graver they afterwards did with the brush. There is nothing distinctive in them, nor in most of the others, to show where they were printed. Many writers have assumed that these prints were made by a frotton, or soft cloth cushion stuffed with wool. It is said that after the type was inked and the paper laid upon it this cushion was rubbed over the back. Every printer knows that this is impossible. The paper would slip, and there certainly would be smudges even in the cases where the attempt was half-way successful. It appears, on the contrary, that they were executed by a screw-press, or by percussion upon a solid block at the back, as printing is now done by a proof-planer. This accounts for the shiny appearance of the unprinted side. The image-prints were soon followed by block-books, by which is to be understood books printed from engraved blocks, without the assistance of typography. There are two kinds—with and without text. They were made both before and after the discovery of the present art, but after typography had spread widely their use ceased. The number of works thus given publicity does not seem to be great. Sotheby, in 1858, could describe but twenty-one, and the additions since made have been but few. But the editions were very numerous, showing that there was a large demand for the books and that many printers were employed upon them, and also that a popular work was taken up and reprinted by rivals without considering the rights of the one who first issued it. Eight editions are known of the Ars Moriendi and six of the Bible of the Poor. It has likewise been shown that the blocks grew old and worn out, and that they were mended and re-engraved. The sheets are mostly printed in rusty-brown ink upon one side of the paper, which is generally very thick, harsh and uneven. The most famous of these books is the Biblia Pauperum, or Bible of the Poor, the title being used to distinguish it from a complete Bible. It was printed both in German and Latin, but at what dates cannot be definitely stated. Germans believe the first edition to have been executed in Germany, while Dutch authorities claim it was done in Holland. The illustrations have an artistic merit, but the text is very rudely cut and has many abbreviations. It had forty engravings and as many leaves.

The illustration given herewith is a fac-simile of the first page of the edition brought out at Nordlingen, in Germany, in 1470, by Walther & Hurning. On the right is Gideon with the Fleece; on the left is the Temptation of Eve, and in the centre is the Annunciation. This edition was one of the last published from blocks in Germany. An Italian edition was brought out at Venice as late as 1512, and block-books of inferior merit were printed after this. One was engraved in China for the Jesuits in 1671.



BIBLE OF THE POOR.

Writers on typography have argued at some length to prove that from the wooden blocks of Holland and Germany originated in the first place wooden letters, in the next place cut-metal letters, and finally cast-metal letters. This theory, after the study that has been bestowed upon it by the new school of writers, does not seem to deserve much consideration. Many of the printers of block-books may have, at a later date, become printers from movable types, but the course of development was not as represented. The smallest wooden letter to-day made by a wood-type cutter is a third of an inch in height. To cut this with accuracy tools are needed of a complexity and finish that could not have been had in Mentz or Haarlem, nor indeed in Amsterdam, London or Paris, in the fifteenth century. Squareness of body is essential in printing, as otherwise the form will not lift, but it would be just as impossible for the wood-worker of the Middle Ages to have made a thousand characters with square bodies and even faces by means of a hand-saw as it would be at the present day. Each letter has six faces, top, bottom and four sides, and each must be at an angle of 90 degrees from the face or faces next to it. The reader can judge how difficult this would be by asking the most expert joiner or cabinet-maker to repeat the experiment, using no tools but a hand-saw. The faces of the earliest works commonly deemed typographical do not look like those of wooden types, which break away by slivers when too great or too irregular a pressure is applied, but rather like metal types, which crumble and break off under the same circumstances.

Blocked. — This applies to the lettering on cloth book-covers, which are blocked at one operation, not hand-stamped.

Blocked Up.—Type is said to be blocked up when, owing to some circumstance, it is not printed off.

Blocking - Press.—A press which stamps words, letters or ornaments into the sides of books ; an embossing-press. The former term is used in England ; the latter here.

Blocking-Tools.—Tools used in making the stamps for a blocking-press.

Blocks.—1. The metal or wooden supports for stereotype or electrotype plates. They are about three-quarters of an inch high, and if of wood are generally of mahogany. See STEREOTYPE BLOCKS. 2. A stamp used in a blocking-press or embossing-machine to give ornament or to place words upon the sides.

Bloqué (Fr.).—Turned ; caractères bloqués, turned letters.

Blotting - Paper. — A thick, heavy paper, made without size, and capable of absorbing spots of writing-ink. It has almost completely taken the place of black sand, which used to be thrown over a written page so that it might not blot. Many advertisements are printed upon pieces of blotting-paper, which are then distributed by business men among probable customers. The fibres pull off on the press, and the type, ink disk and rollers require frequent cleaning when this paper is printed. It is also used for interleaving and for many other purposes, and in these cases may be very thin.

Board Racks.—Racks so contrived as to hold letter-boards, with their contents.

Boards.—Heavy sheets of material resembling paper which are used for various purposes in printing and binding. They may either be made directly from the vat, or the sheets may be combined afterwards by pressure or paste. Formerly, when books were given a temporary binding, it being expected that this covering would soon be replaced by a better and more permanent one, the substance used was pasteboard, and the book was said to be in boards. In binding the term boards is also used in connection with backing, cutting, gilding and burnishing, these being wooden boards. Printers also use letter-boards, distributing-boards and press-boards. The latter are sheets of mill-board, but very smooth and of better quality than those employed in the covers of books.

Bodkin.—An awl used in correcting, formerly perhaps necessary, but now never to be employed except in the greatest exigencies. Type should be corrected on galleys, and if it must be corrected in forms made up it is not a difficult matter to raise the lines with the fingers, extract the letters to be taken out, and put in others. The habitual employment of the bodkin and tweezers indicates bad management or bad workmanship. In bookbinding a bodkin is used to punch holes through the pasteboard covers, so that they can be laced into the book.

BODKIN AND TWEEZERS.

Body.—The size of a type, considered down a page or a column. While all type-founders in one country make type of the same names, their standards are different, and the type differs in consequence. The seven sizes of letter, nonpareil, minion, brevier, bourgeois, long primer, small pica and pica, are like the eight notes of the musical octave. The pipe for the lower octave is just twice as long as for the upper octave. So the seventh size in printing is just double the smaller one. Nonpareil is a twelfth of an inch in magnitude and pica a sixth of an inch, and between these are five other sizes, making the interval one seventy-second of an inch. But a third or a quarter of this makes a perceptible difference, and a nonpareil which is one line in fifty larger than another is called a large body, while one as much below the usual standard would be called a small body. Minion varies the most, ten lines in some minions equaling eleven in others. Almost all type-founders have several sizes of each body. The width of the type has nothing to do with the body. If the latter should vary the hundredth of an inch, some letters being larger than others, the form would not lift, and if they varied one in two hundred it is probable it would not lift. The gauges in casting must be as accurate as one five-thousandth of an inch, which is about a tenth of the thickness of an ordinary thin sheet of book-paper. Differences occur between the same type cast at different times.

Body of the Work.—The text or subject matter of a volume is thus described, to distinguish it from the preliminary matter, the appendix or the notes.

Bogen (Ger.).—A sheet.

Bogenanleger (Ger.).—A feeding-machine.

Bogus. — Copy given out to compositors on daily newspapers, the type composed from it not being used. Frequent complaint used to be made that men were kept till 2 or 3 o'clock in the morning, while they only had three or four hours of work, or that after waiting a couple of hours they could obtain only enough copy to keep them going for half an hour. To remedy this injustice some offices put the men on time, but it was finally resolved by Horace Greeley, on the New York Tribune, to give them copy to set which was worthless, the type thus used to be thrown in as soon as composition was completed. This was called bogus, and most daily newspapers gave this to the men instead of allowing them time. It is a surprising fact, but attested by the experience of many offices, that fewer lines of this kind of matter are set by the men in the same time than if the type were to be used. The copy is reprint and plain, no Italic is followed, and in most places the compositor can change it as much as he may desire. Yet as he knows it will not be used he does not hasten.

Bogus Manila.—A mixed wrapping-paper, inferior to the pure manila.

Bohemian.—1. A number of newspapers are published in this language in the United States. It was once set in black-letter, but work is now entirely done in Roman. The accented characters are :

č ď ě ň ř š ť ž ý ů

Where the language is set in German letters sk and sl are logotypes. 2. This term is also given to literary persons, newspaper writers, artists and musicians, owing its origin to the genius of Henri Murger, a French writer, who applied it to the happy-go-lucky dwellers in the Quartier Latin. Of late years it has been applied in the United States almost exclusively to writers for newspapers and periodicals, but the conditions of life of the French metropolis sixty years ago do not apply to American editors and reporters. They do not spend their time over the flowing bowl, but are as a rule in the cities men of as good habits as any others. They are careful and prudent, very little like the Bohemian of Paris. The type has also died out there.

Bois (Fr.).—Wood; thus used as a name for furniture.

Bold-Face.—A type with heavy lines, but bearing much resemblance to a Roman. The heavy lines of the original are much thickened, while the light lines are left as they were. This style was introduced by Thorne in the early part of the century. It is often called full-face and sometimes title, but the true bold-face differs from the others in having some lines very light.

This line is in Bold-Face.

Bolder Face.—This term is used properly in relation to the heaviness of the strokes which compose the characters, but as letters with heavy strokes require more room it has a secondary meaning of wider face.

Bole.—A red earthy mineral, resembling clay in character, used in preparations for edge-gilding.

Bolster.—A stop at the end of the ribs of the press to prevent the carriage running out too far.

Bolt.—1. The fold in the head and fore edge of the sheets. 2. The iron bar with a screw and nut which secures the knife to the plow.

Bonds.—These are not usually done by letter-press printers, but by lithographers or plate-printers. The paper must be good bond paper, strong and flexible. For small organizations a good writing-paper is sometimes used.

Book.—A number of sheets brought together, folded and stitched or sewed, a cover then being put on. Many books are printed in parts, as this Dictionary is, but are designed ultimately to be bound. Book-printing is the primary branch of printing. While it is true that the Letter of Indulgence of 1454 is earlier than any book with a certain date, it is probable that Gutenberg had already been employed for several years upon his Bible, and the proportion of work that has come down to us from the fifteenth century which is not in book form is very small. The names of printing and the art of printing in German (Buchdrucker and Buchdruckerkunst) indicate that it comprised the whole of the art. In Holland, the only country where there is a serious contest with the Germans for the honor of the invention, the same name, Boekdrukkunst, is given to printing.

The word book is derived from the Anglo-Saxon boc, supposed to be from the same root as beech, the bark of which affords sheets large enough to be written upon. The Grecian word biblos is derived from the Egyptian name of the papyrus. The Latin word was liber. From these three roots there have been formed a great array of words relating to the writing, the manufacture, the preservation or the sale of books. The original form of a book was a roll, and this use of the word is preserved to-day in the Exchequer Courts of England. Leaves, barks and papyrus, an Egyptian rush split in two, formed the earlier books, which were far less extensive than they have since become. Writing upon them was done with a brush or an artist's pencil. Vellum and parchment later became the principal substances thus used, and after a time they assumed a square form or a form approaching it. The ancient Romans bought their books from professional transcribers, who sometimes kept a number of copyists on wages or a dozen or two of slaves to perform the writing. Some gentlemen had one or more servants who did nothing else than copy desirable books. In the Middle Ages this work was principally done in convents, although there were many calligraphers who plied their calling as laymen. The introduction of printing did not entirely put a stop to the copying of manuscripts, as for a century more the writers did Oriental and Greek manuscripts, and were employed to make the initial letters of chapters. The first printers copied the manuscripts of the day very closely. The Gothic letters of Germany were perceived by the early printers not to be of the best form, and before the year 1500 many attempts were made to introduce a rounder and a clearer type. The German readers, however, rebelled; they had learned the handwriting then current and desired no change. The Roman and Italic of to-day originated in the Italian manuscripts used before Sweinheym and Pannartz went to Italy. The first printed books were in folio and quarto, and afterwards smaller sizes were introduced. The paper was of great thickness and strength, the binding was well done, and the covers were of strong, heavy boards, or of some other material that would be likely to endure. As a consequence many of the works printed before 1500 are still in existence, although the editions were small. Great activity was shown by the first printers, and much unsold stock was left on their hands. The first few were type-founders, press-builders, printers, editors and binders all at once; but as more persons entered the occupation it gradually was subdivided. The earliest works brought out were theological, and this continued for a couple of centuries the predominating class. Classical books were the next, and then came works on medicine, law and history. It was impossible to popularize books when a pound of paper was worth from a quarter to a half of the day's wages of an ordinary workingman, and when books were covered with leather of some kind. A cheaper method of making paper came into use about the beginning of this century, as did also a more effective press, and about 1825 cloth binding began to be used. The book which was worth a guinea in Walpole's time could be made fifty years later for ten shillings, and can now be manufactured for five. The purchasing power of the community has increased, while the cost of books has steadily diminished. Common book-paper is now worth only about the fifth of what was asked for it a hundred years ago. Stereotyping has provided a method by which booksellers shall have the least possible remainders of stock, and there are now great facilities for the distribution of published works. A society in England, of which Lord Brougham and Charles Knight were at the head, accomplished a great deal in the way of popularizing books, and in this country Harper & Brothers, with their school district libraries, made it possible for every country neighborhood to have a sufficient library. For many years there were publishers in the United States who brought out what was known as yellow-covered literature, cheap reprints of popular novels and sensational books, and of late "libraries," at ten and twenty cents a number, have been common. Each of the great religious denominations now supports a publishing-house, and since the establishment of the British Bible Society in 1804, of which Lord Teignmouth was the first president, and of the American Bible Society in 1816, vast numbers of Bibles and Testaments have been issued at cost.

Besides the works brought out for sale by booksellers there are two other classes of books. Subscription books are disposed of by agents, who make a business of one book, or at most of half a dozen. Very extensive sales are sometimes made of such publications. But by far the largest number of books sent out are those in relation to some business interest, or which are purely local, such as directories, almanacs and catalogues, although these are only a few of the titles under which these books can be classified. They are a necessity of trade, and taken altogether they require much more of the labors of the bookmaker than either of the other classes.

The first abundant literature is that of the Greeks. Abundant, of course, is only comparative, as a copy of every early Greek work extant can be put into a single bookcase. Hebrew literature before the dispersion of the Jews is scanty, consisting of the Bible and a few other works. Latin literature, taking that of later times with the earlier, is abundant. From the time of Cæsar and Cicero that language continued till two hundred years ago to be the common speech of the world. If an Italian wrote to an Englishman or a Dane he did not employ his own tongue, but wrote in Latin. All works of erudition were in this language. Even to this day in some Dutch and German universities lectures are delivered in Latin, and the debates in the Hungarian Parliament were conducted through this medium until forty years ago. The modern tongues of Europe, in their literary sense, only date back to about 1300, and many of the earlier writers, like Dante, felt compelled either to defend or apologize for using an inferior medium. Each of the greater languages has now a vast mass of literature. Of these English, French, Dutch, Italian, Spanish, Portuguese, Polish, Danish and Hungarian use the Roman character; German and some works in Swedish and Danish have the black-letter; Russia uses the Russian character; Turkish and Arabic employ the same letters, but Greek stands alone. Besides these there is no considerable amount of printing done with types. Persian and the languages of India have, compared with us, little printing, and Chinese is still drawn and cut. The number of people who use the Roman character is not less than 250,000,000, and nine-tenths of the printing of the globe is executed in it, the bulk of the remainder being in German.

Books are divided for the convenience of the trade and for more easy reference into sizes which have specific names. They are printed in types of various magnitudes, are illustrated more or less, their paper differs in quality, and their binding is of many kinds. Books are known as folio, quarto, octavo, 12mo, 16mo or with other figures, depending upon the number of the folds of the paper. In the last century, when this nomenclature became fixed, the ordinary sheet of paper was about 16 or 17 inches by 22 or 23. When folded, the pages would be of about the size which we denominate by the names given above, and these appellations still continue to be used, although the paper is now twice or three times the magnitude it was then. In American offices the ordinary sized sheet, more used than any other, is 24 by 38, and octavo pages are printed upon it sixteen at a time, so that if required thirty-two pages can be printed on the sheet, sixteen on each side. The size of the leaf would be 6 by 9½ inches, and the matter probably about 4 by 7½ inches. But this size of paper, which is known to us as double-medium, is made both smaller and larger. The English use instead a smaller paper, known as double-demy, 22½ by 35 inches. The name of the size of a book is derived from the number of pages on one side of the former sheet, and has not been changed since the magnitude of the latter has increased. Quartos and folios are now rarely issued, except when illustrations are used or tables of some size are to be inserted. Octavos and duodecimos are the most common; 16mos are generally nearly square in shape; 18mos and 24mos are used for all kinds of somewhat small-sized books, while 32s and 36s are about the limit for ordinary work; but for small hymn-books, Testaments, prayer-books and some other purposes they descend to 128mo. There are difficulties in printing and folding sheets containing small pages, but greater difficulties still in binding them. Librarians and cataloguers are greatly dissatisfied, now with the sizes of books, and many authors object strenuously to some of the customs of printers. The former claim that books should be catalogued according to their absolute sizes, and not according to their relative ones. An octavo page may be 11½ inches high, and it may be no more than 8½, yet the same name is used, with the prefix royal, imperial or small. The signatures afford no indication. A sheet may be worked and turned, having only one signature; another may be worked with different forms on each side, thus having two signatures. Melvil Dewey, librarian of the New York State Library, recommends that books be made only of certain sizes. They would fit better into the shelves of libraries. Few books exceed eleven inches in height; few fall below five. Twelve sizes, rising by half an inch, would cover the whole of them. The following names have been recommended:

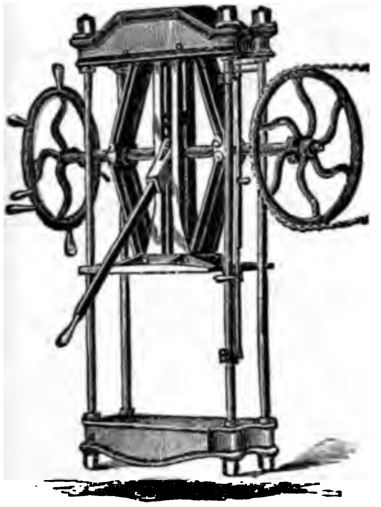
Large folio, over 18 inches; folio, below 18 inches; small folio, below 13 inches; large octavo, below 11 inches; octavo, below 9 inches; small octavo, below 8 inches; duodecimo, below 8 inches; decimo-octavo (18mo), 6 inches; minimo, below 6 inches; large quarto, below 15 inches; quarto, below 11 inches; small quarto, below 8 inches.

The following are the current sizes of books in America, the size of leaf being given in inches: Imperial octavo, 8 by 12; super-royal octavo, 7 by 10½; medium octavo, 6 by 9½; crown octavo, 5½ by 8¼; medium 12mo, 5⅛ by 7⅔; medium 16mo, 4½ by 6¾; medium 18mo, 4 by 6⅓; medium 24mo, 3⅝ by 5½; medium 32mo, 3 by 4¾; 36mo, 3⅛ by 4; 48mo, 2⅜ by 4; 64mo, 2⅔ by 3; 72mo, 2 by 3⅛; 96mo, 2 by 2⅜; 128mo, 1½ by 2⅔. It should be noted that these last sizes are very rarely used.

Bookbinding.—The folding and bringing together the sheets of a book in orderly sequence, and then putting over them a cover, to which they are secured. In a proper sense the ancients knew nothing about bookbinding, as their literary works were in rolls. But after papyrus ceased to be the chief substance upon which writing was done, and parchment and vellum were used, leaves of a quadrangular shape were found to be most convenient, and to fasten them together and cover them was something that would immediately occur to anyone.

The operations of bookbinding are many. The first is folding, which is not difficult, although it must be exact. When this is done one of each of the sheets in the book is in turn taken, so that when complete all the sheets may be represented. This is called gathering. Each book thus gathered is rapidly looked at to see that no sheet is duplicated and none missing. This is collating. The sheets are then sewed, stitched or in some other way fastened together, and then a cover is secured to them. The cover may be of cloth or paper, if in quantities, or in one of the numerous styles of leather or of leather and paper or muslin combined. The cover generally consists of some stiff material inside and of a finer material outside, and this again is stamped, gilded, printed upon or tooled. The back must be rounded and the front edge made concave to correspond to the back, while all or some of the edges may be gilded, stained, sprinkled or marbled. As divided by binders, the work is job-work or edition-work, the latter being when a large number of copies are brought out exactly alike in comparatively inexpensive bindings. In this case much of the labor is often done before the sheets arrive from the printers. Job-work includes all the rest. Fine bookbinding is only executed in shops where they are prepared for it, as the materials are expensive, and a man who is not a thorough workman can very easily injure that which is intrusted to his charge. The binders are divided into forwarders and finishers. Most binderies employ many more girls than men, as the operations require quickness, while high wages cannot be paid. The operation may be subdivided into preparing, binding and finishing.

1. PREPARING.—The first step is to dry the sheets. This is a part of the printer's business where the printer



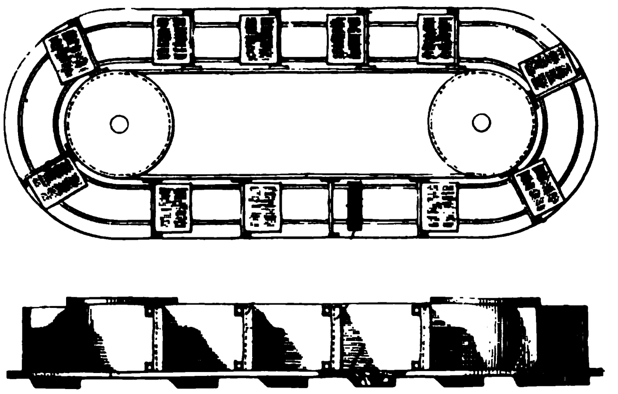
BOOMER PRESS.

and binder are not under the same roof; but there are more facilities in the binding department for performing the operations which follow the presswork. Paper is now generally worked dry, but is occasionally used wet, and then needs to be aired a day or two to get the moisture out. On a windy, dry day sheets will dry in half a day more than they sometimes will in three days of wet weather. Time enough must be given for the ink to dry. This can rarely be done as regards bookwork in much less than a day, some inks requiring a week and others still longer. In offices which do their work in the old-fashioned way the sheets are laid upon horizontal wooden bars to dry, being placed upon them by instruments called peels, which are long sticks with a crossbar at the end. But in most modern bookbinderies there is a hot-air room, either with or without closets. If it has closets these are so arranged as to run in and out, each one having a number of rods upon which the paper can be laid. When the closet is closed it is exposed to a current of hot air. Good bookbinders, however, say that cold-air drying can alone be relied upon to give the sheets their proper appearance, as hot air causes them to exhibit a somewhat wrinkled surface. The sheets are afterwards placed in the standing press, either with boards between each one or in mass. These standing presses are of three kinds—the ordinary press, moved by a screw, in which the power is comparatively small; the mechanical press, having a combination of levers and screws, such as the Boomer, which is shown herewith, and the hydraulic or Bramah press, in which a force of from fifty to two hundred tons is applied. There is also the signature press, used after the sheets have been folded, which works admirably. The great difficulty in getting the sheets to look right is that if the ink does not dry easily, but only skims over, there is frequently an off-set or faint impression from one sheet upon another. When this is apparent the sheets should be given a further time to dry.

As far as this the work is frequently done in the printing-office, and indeed binders say that drying is none of their business. The printers do hot-pressing, too, to give a greater gloss.

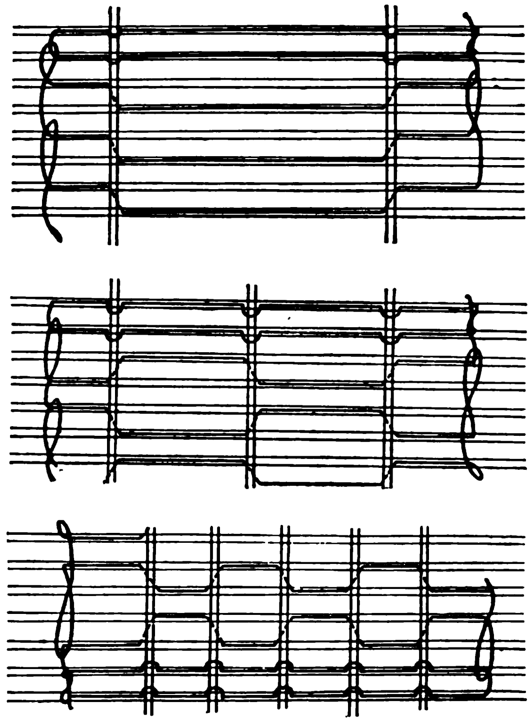
The first operation in binding is folding. The sheets are laid on a board before the folder, the signature being downwards and at the left hand. With an ivory instrument, known as a folder, the operator folds the sheet and presses it down. Folios have only one fold, quartos two, octavos three and 16mos four. The 12mos, 18mos, 24mos, 36mos, 48mos, 72mos and 96mos have a part which is folded in, generally so as to come either at the extreme outside or the extreme inside, and it is most usual to have this part cut off so that it can be folded in with less difficulty. Thus a 12mo is an octavo into which is set a quarto, or a quarto into which is set an octavo. Great accuracy is required in folding. In many shops, if not in the majority, folding-machines have been introduced which do their work very quickly. On large pages they do well, but in very small books they sometimes fold badly as to margins. The folders having proceeded till they have folded a sufficient number of copies of the book to begin on, the next operation is gathering. The folded sheets of the same pages are each placed in a pile by themselves, A being in one place, B in another, and so on. A girl passes by the side of each heap and takes off one sheet, beginning with the first signature and ending with the last one of the work. This gathering completes a book, which she lays down, and she then begins another one. Unless the book is one in which there is no hurry, several girls are working at this at once, interfering somewhat with each other. To obviate this and to do the labor more quickly a circular revolving platform has lately been introduced with a circumference of from fifteen to thirty feet. Upon its edge are tall piles of folded signatures, and around it sit the girls. The platform is made to revolve slowly, and as each pile passes each girl she takes a sheet from it and adds it to her gathering. If there are twenty signatures and twenty girls, the machine revolving in a minute, each revolution takes off four hundred sheets and twenty complete books. Thus in a day 12,000 books could be taken off if there were no interruptions. An illustration of this platform will be shown under GATHERING. Another method of doing the same thing is having the carriers describe an ellipsis, as here represented.

An experienced hand carefully examines each one of these gatherings to see that none of the sheets has been omitted or duplicated. In all processes prior to this wherever a defective sheet has been found it has been thrown out. Collation is very quickly done. The collator only looks to see whether the signatures B, C, D and so on follow each other in regular order. A is the title-page, the signature not being shown. This is a letter or figure below the rest of the page, at a certain place in the line, and always comes in the first page of the sheet. Secondary signatures, however, may exist in addition. The collator bends the book enough to enable him to see whether this signature is there, and looks at nothing else. Until recently it was a practice to reduce the sheets to a more solid state by using a backing-hammer, which was a very heavy one. Later a rolling-machine was contrived, in which the sheets, between two tin plates, were passed between two rollers. This was found to be more expeditious than beating.



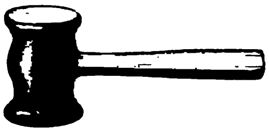
GATHERING-MACHINE.

Sewing is the next operation. The sheets are not actually fastened one to another, but all are in common attached to a range of parallel strings or bands placed across the back of a volume. Sometimes marks are made by a saw at the back, cutting in far enough to wholly or partially embed the strings, but in other cases these saw cuts are dispensed with. The process of sewing is carried on by the aid of a sewing-press, which consists of a flat bar or board, two upright bars rising from the ends of this, and a crossbar at the top. The strings are fastened to the crossbar and are stretched vertically downwards to the bed of the press, where they are firmly secured. The number of the strings depends principally on the size of the book, and varies from two to ten. The sewer sits in front of the press, lays a folded sheet down on it with the back edge in contact with the strings, opens the sheet in the middle and sews it to the strings, passing a needle and thread to and fro. The needle passes through the back edge of the sheet twice as many times as there are strings, the object being to twist the thread around every string and thus connect them and the sheet together. The first sheet having thus been treated, a second is laid on the first and sewed in a similar manner; and so on with a third, a fourth, and as many as there are to form the volume, all the threads being fastened to the strings and indirectly to each other; for the thread passes from one sheet to another by a peculiar kind of stitch called a kettle-stitch. There are several other methods of securing the sheets, but the above is the only one properly known as sewing. Centre-stitching is the method used for all pamphlets of but one section. The thread is sent through the centre of the fold to the back and is then reversed. This cannot be used with pamphlets of any thickness. Side-stitching is where an awl or a thick needle is driven through several sections at once and is followed by the thread. The most common method, however, to do this is with a stabbing-machine. The strength of the pamphlet depends almost entirely upon the width of paper there is between the stab and the back. If the paper is the common, weak paper of to-day the thread can easily cut its way through. Bound in this way, too, the book or pamphlet is stiff. It does not open well. Whip-stitching is a method of binding single leaves that requires a large provision for waste at the back. The back edges of the leaves are sewed with overhanded and cross-lashed stitches. Fiddling is a similar method of securing leaves by the use of glue. See also WIRE-SEWING.



ORDINARY SEWING.

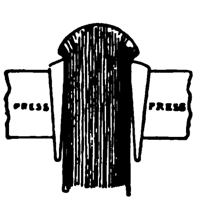
2. BINDING.—The sheets have by the sewing process now been brought into the form of a book and are ready for the further operations, which are known by the binders as forwarding. In forwarding every operation that holds the book together and adds to its strength is done; the operations of finishing are ornamental. In the account under this title will be given the commoner and older methods; novelties will be mentioned under their respective heads. The back edges of the book are glued together to increase the strength of the volume; this is done by holding the book in the left hand and brushing on it a little warm melted glue. The glue having dried, the ends of the strings, which are allowed to hang loose for an inch or two beyond the volume, are scraped thin for the sake of being rendered invisible when the books come to be bound, as well as to aid in fastening on the boards. The volume is next rounded. It is made convex on the back and concave on the front. The workman lays the volume down flat and beats it with a hammer held in his right hand, while the left draws the sheet in such a way as to produce the rounding of the edges, the manipulation being a curious one. The glue is not yet entirely dry and yields a little to the action of the hand and the hammer.



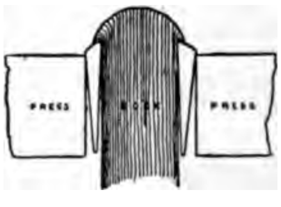
BEATING-HAMMER.

A groove is now made to receive the boards or stiff covers. A thin bevel-edged board is placed on each side of the volume, far enough from the back to allow of a kind of ledge to be formed. These backing-boards, as they are called, are placed parallel with the back edge, and the volume with these boards on either side is lowered into a press with the back edge uppermost. By hammering this edge in a particular way it is made to expand or spread out and thus to form two ledges against which the covers of the book are to be placed. In common language the covers of a book are the hinges; yet the bookbinder understands the stiff envelope to be the board, the leather or board applied outside the board is the cover, and the two together form the case.

If the book is to be boarded the edges of the leaves are not often cut; but if it is to be bound the cutting of the edges is an essential part in most books, and is done before the boards are fitted to the volume. Nearly all the cutting is now done by machines, but an earlier process, still followed more or less, is to have the volume, placed between two boards, screwed into a press, one of the ends of the volume being left to project a little above the press. A cutting instrument, called a plow, partaking in some degree of the action of a carpenter's plane, is passed over the end of the volume so as to shave off the edges of the sheets and leave them perfectly smooth. The volume is reversed in position, and



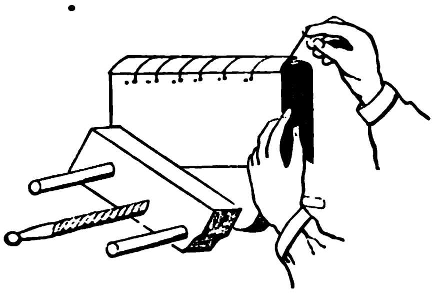
BEFORE BACKING.



AFTER BACKING.

the same thing done with the other end. It is then taken out of the press and struck forcibly against a bench so as to bring the convexity of the back and the concavity of the front alike to a plane level, which admits of the front edges of the leaves being cut in the same manner as the top and bottom edges had been. The book springs back immediately on being released from the press, and then presents the neat appearance which a concave front edge, convex back and plane top and bottom edges are calculated to give.

The stiff boards are now to be applied. These are made of mill-board, a smooth brown or drab colored pasteboard made of several layers of paper glued, pasted or pressed together, which vary according to the size and thickness it is intended to have. They are cut either with gigantic shears or by a machine. In attaching these boards to the book the strength of the fastening depends on the kind of binding. If the book is to be bound holes are made through the boards opposite to the strings, and the loose ends of the strings, being passed through these holes, are glued down firmly to the inner surface of the boards, thereby forming a very firm fastening. If, on the other hand, the volume is to be in cloth boards the strings are not passed through and pasted down in this way, but the boards are fastened to the book chiefly by being pasted to the blank leaves or end papers placed at the beginning or end of the book. These boards in this latter case are brought somewhat to a finished state before being attached to the volume, the cloth being cut to the requisite size and pasted by a workman upon the two covers, placed sufficiently wide apart to allow for the thickness of the book. Some books, especially at the present day, are made hollow in the back. A double layer of paper or of cloth is placed between the leather of the cover and the back of the sheets; the leather is glued to the outer layer, and the back edge of the sheets to the inner layer, and as the two layers are connected at their edges, but detached or loose from each other at their surfaces, they give a kind of hollowness to the back of the book.



HEAD-BANDING.

Most well-bound books have a little appendage at the top of the back of the book called a head-band. This gives a neat finish to the book and at the same time strengthens the leather covering of the back edge at that part. For common books the head-band consists of an inserted silk or cotton cord, but for better work it consists of a little strip of vellum or pasteboard, around which colored silken threads are twisted by the same process as that which unites it to the volume.

When the volume is done in cloth of one uniform color the cloth cover is applied to the boards before the latter are attached to the volume; but when it is whole bound, having leather all over the outer surface, or half bound, having partly leather and partly paper or cloth at the surface, these coverings are put on after the boards are attached to the book. The leather is cut to a size rather larger than the book to allow for paring and turning in, and is laid face downwards on a smooth board. The back of the leather is well pasted, the book being placed upon it, and the hands of the workman draw, smooth, press and adjust the leather till every part is closely adhering. If half binding be the style of work, then the leather is so cut as to cover the back and a small portion of each board or side, while four small pieces are applied to the corners. The paper or cloth is subsequently so pasted on as to hide the ragged edges of all these five pieces of leather.

3. FINISHING.—By the processes above described the book has received all the parts which are really necessary for service; the sheets have been arranged in proper order, sewed to strings, fastened to boards, and covered with cloth, leather or paper. But a large portion of the talent, the ingenuity and the capital applied to this branch of manufacture is called forth by the subsequent processes to which the book is subjected. The edges, for instance, must be attended to. Most persons who purchase books are aware that books are frequently sold with ragged, uneven and uncut edges at the bottom and side, while the top, though level, is uncut. In some cases, to make a nearer approach towards neatness, the fore edge only is cut; very often the whole of the edges are cut, but left white. Formerly this used to be regarded as a blemish, but it is now the rule. On the old theory, white edges on a book would soon become discolored and unsightly, and it became usual to sprinkle the edges with color or to gild them. A third plan was coloring. In this the edges of several sheets are held on a level one with another, and a piece of sponge, dipped into liquid color, is passed lightly over the edges so as to impart a tint to them evenly. A more general method is that of sprinkling. The books are in this case ranged side by side on a bench, and a brush, dipped into the liquid color, which is formed of some such pigments as Venetian red, umber, &c., is held over the books and lightly tapped against a stick, whereby a shower of spots falls on the edges of the books, producing an appearance depending on the color employed and the manner in which the shower of spots is brought about. Marbled edges are sometimes produced by a peculiar admixture and management of different colors floating in a vat.

Gilt edges are more delicate in their preparation. The gold so applied is in the same state as for various other ornamental purposes, an extremely thin leaf. Before the case or cover of the book is quite finished the volume is struck forcibly against the back so as to make the fore edge flat instead of concave. It is then placed in a press, with the exposed edge uppermost. The edge is scraped smooth with a piece of steel and is coated with a mixture of red chalk and water. The gold is blown out from small books and spread on a leather cushion, where it is cut to the proper size by a smooth-edged knife. A camel's-hair brush is dipped into white of egg mixed with water, and with this the partially dry edge of the book is moistened; the gold is then taken up on a flat kind of brush and applied to the moistened edge, to which it instantly adheres. When all the three edges have been gilt in this way and allowed to remain a few minutes the workman takes a burnisher formed of a very smooth piece of hard stone, and setting the end of the handle against his shoulder rubs the gold forcibly, not, as might be supposed, endangering its permanence, but giving it a high degree of polish, by rubbing down the minute asperities which may be occasioned by the paper beneath. The gold employed has a greater or less degree of solidity, according to the costliness of the work. There are several methods of applying the gold, for which see under GILDING.

Covers are made of various substances, beginning with leather. The leathers so employed are morocco, russia, calf and roan or sheep. They are dyed in the dye-houses when color is required, though it was formerly the custom for the bookbinder to color them more or less; at present he finds it cheaper to buy them already dyed. When dyeing is done, however, the books are opened and hung over two bars in such a manner that the leaves may hang vertically downwards, while the boards are horizontal. A brush is dipped into the liquid color and dashed or sprinkled on the cover so as to give a group of spots or wavy lines, at the taste of the workman. Calf and russia leathers do not often receive any modification of their surface from the bookbinder, but morocco is sometimes grained or grooved by him.

The decorations produced on a leather-bound book by heated stamps or dies are very diversified. The book is clamped or held in a finishing-press. The dies for producing any particular device are fixed to handles, and when about to be used are heated in a gas stove or furnace. Many such dies are often used for one book, very beautiful and intricate patterns being produced by them. The process of producing a sunken ornamental device by using these tools by hand is called blind tooling. But for many purposes it is more convenient to fasten a great number of small dies to a metallic plate by means of glue and cloth and stamp the device from this fixed plate by means of a press. This is called blocking in England. The way just described has been superseded in America for most work by the use of a brass engraved plate that has just the design wanted. This is done on an embossing-press, which is more powerful than the old blocking-press.

LEO'S FINISHING-PRESS.

All the devices so produced on a book are called blind if no gold is employed; but much of the beauty of the workmanship depends upon the tasteful introduction of this metal in forming part or all of the pattern. The leather as laid on the book, is not in a fit state for receiving the gold without a modification of surface. It first receives a coat of parchment size; then two or three coatings of beaten white of egg, whereby a slight glossiness is produced, and just before the coating is put on the surface is slightly moistened with oil. The gold, cut up into small pieces to suit the kind of ornament, is laid on the book with a flat camel's-hair brush, and the stamp or die, previously heated, is impressed on the gold, whereby two effects are produced at once—the production of the device and the fixing of the gold to the leather. A piece of soft rag lightly passed over the book removes the superfluous particles of gold and leaves the gilt device clearly marked.

But the decoration of volumes bound in cloth, although occupying a far lower level in respect to manual dexterity than the more costly binding in leather, has occupied much attention within the last half century, and has superseded leather binding in nearly all kinds of cheap work, while having a beauty of ornamentation all its own. It would have been impossible to have found leather enough to do this work as it should be done and at the same time to furnish books at a low price. The cloth with which books are covered is generally cotton of a particular kind, woven for the purpose. When this material was first introduced, about 1830, the cloth was used in the unaltered state, with the warp and weft threads visibly crossing each other at right angles. But now the cloth is generally so altered by an artificial embossment of surface or by a peculiar method of weaving as to leave the threads barely visible in some designs, and to give them a close resemblance to leather. Many beautiful faces and appearances of cloth are now known, and these designs are of all colors, having a great variety of textures. Patterns are also produced in them at the mills by embossing. Some cloth covers, especially those that are to any extent decorated with gold, are stamped or embossed after being pasted on the boards instead of before. They are, in fact, cases, each one quite ready to be affixed to the book in a speedy manner after being stamped. Great pressure is required in this process, for the mill-board is required to yield to the force as well as the cloth itself. The case is placed down flat on an iron bed heated with gas from underneath; above is a press, to the lower end of which is attached the stamping die or device, face downwards. Great mechanical power is then brought to bear on it, and the press descends with force sufficient to impart the pattern to the cover, gilt or not, according to the circumstances of the case. Within a few years past printing-ink has been used for decoration, the common method being by feeding the covers into a very powerful small job-press moved by steam.

There are many special devices in bookbinding which will be noticed under their respective heads. The art is an intricate one and takes a long time to master.

Book-Covers.—The outer part of a book; the pasteboard or leather portions, with their coverings or ornamentation.

Book-Folding Machines.—See FOLDING-MACHINES.

Book Fonts.—Fonts of body type distinct from fancy or jobbing types.

Book House.—A printing-office where bookwork more especially is executed, in contradistinction from a jobbing or news office.

Booking.—To bring together the various sections of a book; to gather the sheets in an orderly sequence.

Bookkeeping.—Nothing is more essential to a printer's success than the keeping of correct accounts. It is possible for one to believe that he is making money while he is really losing it, if he does not know the state of affairs from his books. In the generation which has just passed it might have been possible to get along with a single book, such as retail butchers now keep, in which payment is indicated by rubbing out the marks showing charges, the cash account being shown by counting the cash in hand. But printing is now a complicated business; the expenses are of a varied character, and the proper method of ascertaining what should be charged can only be discovered by keeping every item of cost in the most distinct manner. Books must be kept in each department, such as COMPOSING-ROOM, PRESSROOM and WAREHOUSE (see under these heads), and several must be kept in the counting-room. Even so simple a thing as the printing of a card cannot be done without a dozen separate entries. The order must be placed in the order-book; a work-ticket must be prepared to accompany it to the job-room; the compositor must enter on the ticket the time he spends upon it and send it to the pressroom, where the cost of the cards and the time of the press are still further added. When it reaches the counting-room it is sent out, an entry being made of this fact; the boy takes a receipt-book with him, which is signed by the customer; at the end of the month a bill is made out and sent by mail. Later in the month a check or the money arrives, and the cash is entered on the cash-book. No one of these transactions can be neglected, yet the total amount may be only a couple of dollars. The same course would be followed were it a thousand dollars, except that the entries would be more numerous. No attempt will be made here to give any description of bookkeeping generally, but only to indicate some points which must be constantly kept in mind, and to mention a few special books.

Only three books are absolutely necessary for correct keeping of accounts, the journal, cash-book and ledger. All the other books are only memorandum-books. Some mercantile houses have forty books, devised to suit their fancy. The more memorandum-books a business man has to give him details the better will he know the state of his affairs, providing he does not devote too much time to keeping them. In an unsystematic office more time is wasted in the course of a year in hunting for information than would be consumed in keeping the accounts in a shape from which a correct statement could be had at a moment's notice. Letters to customers or to those from whom goods have been ordered should be copied, unless very unimportant, and they should also be indexed. Letters received should be properly filed away and kept for a considerable time after the job to which they refer has been delivered.

The books indispensable to printers, besides those necessary to every mercantile house, or ledger, day-book and journal, are an estimate-book and an order-book. Others are used, as, for instance, an invoice-book, or the one in which they note their purchases on credit; but it is usual in printing-offices to enter all of them either credit or cash, the bill being pasted in, whether paid or unpaid. The bill-book records in one part the notes which are due the printer, and in the other part those which he has to pay. The stock-book, or inventory, is in many places only a statement of what machinery, stock and tools, with bills payable and receivable, are on hand on January 1 or July 1, or both, but in some places it is kept so as to show the accessions to stock and the quantity used up or taken away. An estimate-book and an order-book are both necessary to printers, the former to show what was offered to a prospective customer, and the latter to show what the order was when actually given. There must also be separate books for wages kept in each department, and it is possible to have many more books, each of which shall answer some useful purpose. The ledger and journal will not be touched upon, as these are summaries of the facts found elsewhere, but reference will only be made to the smaller books necessary for a printing-office or that are distinctive to it. With a very slight modification they will prove useful to a bookbindery or to an electrotype-foundry. An office that is doing a business of ten or twelve thousand a year would do well to put on some young man as bookkeeper. He can keep the accounts, hold copy when it is necessary, do up bundles, act as a collector and see customers. When the business becomes much larger his whole time will be absorbed in his books and in collections, and when it approaches eighty thousand he will be obliged to have assistance.

Order-Book.—The first and most obvious record a printer should keep is an order-book. In this should be recorded every order received, whether oral or written, upon which any money depends. An order may be, and frequently is, changed while the work is going on, but this does not prevent the original one from being fully entered. Every item of it should be put down at full length. The book begins at the first page, and the orders, when they run over that page, continue upon the next one. There is no attempt at having anything more than a record here. The sums of money expressed at the end cannot be charged up, for they will not be earned till the work is done. The following may be given as the style of an order-book, the first number being the number of the order:

ORDERS.

401. June 28.—Henry J. Jones, Schenectady; 1,000 copies octavo History of Schenectady County; copy to be delivered July 15; first proofs July 22; thirty pages a day till completed; author to read and return proof within thirty-six hours from time sent out; first copies to be delivered September 1, last September 25. Paper, 24x38–45 lb., laid, at 7c.; proofs twice read by copy; page 1,520 ems long primer, same as Hildreth's History, that style to be followed; extracts in text brevier, notes nonpareil; careful presswork; four cuts inserted, worked on plate-paper. Appendix, preface, index and table of contents to pay extra, according to quantity of type set. Binding, warm brown muslin, gilt top, cut top, sides and bottom, pink head-band. Charge to be $0,000 for 550 pp. long primer and 50 brevier, with extras for each page additional; long primer $2.10, brevier $3, nonpareil $5.30. All to be plain matter. Payments, $200 when work is begun; $500 September 1, and remainder October 15.

402. June 28.—Fitch & Hamilton, 1,000 business cards, No. 4, printer's blanks, $2.75. To be delivered Thursday noon.

403. June 29.—Gayety Theatre, 250 double-sheet posters, 28x42, in two colors, red and black. To be delivered Friday evening at 8 o'clock, C. O. D. $17.

404. June 30.—Charles T. Winthrop, 800 Discourse on Mirabeau; small pica, 24x36, 32 pp., smooth paper. Cover gray granite. Sewed. No proof necessary for author. To be delivered July 20. $52.

In this book everything should be put down with the utmost explicitness. The paper, the ink, the size of type, the binding, the method of payment, all should be entered. In many cases there has been a previous estimate which may or may not conform closely to the order, but the latter shows the terms as finally agreed upon. Many printers have this book in a tabulated form.

Estimate-Book.—This will show what was offered. An estimate, however, does not hold good forever, and the fact that an offer was made in March to do some work then for $325 does not show that it ought to be done for this figure in December. Many jobs come in upon which there has been no estimate and no price has been mentioned. In this case the order, with its particulars, is entered, while the price remains blank. This is not the book on which payment should be noted, yet many printers find it convenient to mark each one as the money comes in, in addition to its entry on the cash-book. Towards pay-day of each week the book is looked over by them to see where some money probably can be obtained. If this is done, convenience dictates that for this purpose a mark should be made against each bill when settled. The letters Pd. in red ink and of larger size than usual will show this very plainly.

Cash-Book.—In the cash-book, which is the next important book, all moneys received and paid out are entered. If the office is a small one, this may be the only book kept besides the order-book. In this the accounts are kept on two pages, facing each other. The payments are entered on the right-hand pages and the receipts on the left-hand pages. It usually consists of a date column, a space for the entry, and one for money at the end. In it each payment is treated as a whole, and is not divided to show each item paid for, for a bill may have many items. When one predominating one is among them it can be entered "William Brown, poster, &c.," but when there is no predominating one it is "William Brown, printing." It is well to specify what the charge is for when there is only one item. In this book the amount of cash actually received and paid out is put down, and not a certain sum, the face of a bill, on which a discount is allowed.

Purchase-Book.—A recent English authority recommends printers to keep a "bought book," or book for purchases. In the plan given everything purchased is entered against the name of the firm from which it was bought, various columns being allotted to machinery, type, leads and consumable material. This plan, however, is a wrong one. It is at once too diffuse and too incomplete. Better methods are followed here. Large blank-books, like scrap-books, of manila paper, are adapted for pasting in the bills or invoices after they have been scrutinized and corrected, if they need correction, and from this parts are copied off and checked to the extent found necessary. If the goods have been delivered in the counting-room they should be examined there to see whether they correspond to the invoice; if in the composing-room, pressroom or warehouse, they should be examined where they have been received. It is impossible for the counting-house to tell whether the articles have been delivered because they are on the bill, which may have been made out correctly at the type-foundry or at the stationer's, and yet through inadvertence a package or two may have been omitted. In the invoice-book they should be pasted in lightly, so that in case of necessity they can be taken out. They are entered in this according to date of bill, not date of purchase.

The purchase-book, which is a subsidiary one and not a large one, needs only four columns, those for date, name of firm and article, page in the invoice-book and amount. In this case, too, the date is determined by the bill, or if for cash without bill, by the time of payment. Wherever possible, however, a bill should be had. Every page in this book is alike, there being no balancing of debtor and creditor. The object of it is to know what has been purchased for the printing-office during a certain length of time. Each bill makes one line, as in the following example:

PURCHASES.

1891.		Page.	
Nov. 7.	Marder, Luse & Co., nonpareil, . .	44	$52.50
" 8.	Marder, Luse & Co., type, ...	44	173.25
" 10.	Geo. B. Hurd & Co., cards, ...	45	19.20
" 11.	John Thomson, press, ...	45	250.00

In a separate part of this book, or in another book, should be each of the items in detail. The figures should be net, not gross, thus representing what actually was paid. But in many cases it is impracticable to do this. A bill is received with a discount of 20 per cent. and a contingency, say that it shall be as great as that some other person received from a rival firm. Or it may be 15 per cent., and if the purchases for the year reach $3,000 5 per cent. more. In this other book the bills should be dissected. In the account devoted to cards all the cards should be given; in that relating to paper all the paper bought; in presses all the presses. Thus it should be carried out for every kind of thing used. A good arrangement for the composing department would be type, leads, brass rule, metal furniture, wooden furniture, chases and iron-work, galleys, frames, stands and cases, and miscellaneous—ten accounts in all. For the pressroom presses, shafting and belting, ink, paper, cards, envelopes, rollers, detergents and miscellaneous. For the counting-room there need be no subdivision. In each of these accounts there should be great minuteness, enough so that if the firm wishes to find out what the cost of a font of minion has been from its beginning it can be ascertained. January 4, 1886, 447 pounds of No. 7 from the Dickinson foundry were bought, and three weeks later 112 pounds were added. July 8 twelve pounds of capitals were purchased, and three pounds of small capitals. Sorts had been bought four times since, on September 7, 1886; December 12, 1887; June 5, 1888, and March 11, 1890, amounting in all to forty-seven pounds. There should, therefore, be in this font 621 pounds. Similarly in the lead and brass-rule accounts it is shown that 480 pounds of leads have been bought during the year, and $37 worth of brass rule. Only by knowing the purchases can the waste be estimated. It is probable that the minion No. 7, above given, would be pretty well worn at the last date, and if it could be weighed it would be found that instead of 621 pounds there would be no more than 580. The 480 pounds of leads purchased, added to the 3,200 pounds already in the office, would make 3,680. If these 3,200 pounds were, however, only known to exist by the purchases made since the office began, four years before, it is probable that two-fifths would have disappeared, and that some of the 480 had been destroyed since the purchase, so that instead of the above amount there were probably only 2,300 pounds in the office. In some other articles the disappearance is still more rapid. An office which begins with four bushels of quoins, that quantity being sufficient, will need to purchase another bushel within three months, and two more during the year.

It is not intended to enter into a discussion of the methods of bookkeeping further than to give an idea of what special books a printer needs and why he needs them. In an office like those in country villages single-entry books are enough. The amount of business done of all kinds is not more than three or four thousand dollars a year, and the printer can, if he will, dispense with keeping his books in the double-entry way. But if he were in a city, and did a business of ten thousand a year, he would find it almost a necessity to use double-entry books. The time spent on books pays better than any other time that a business man has, for it will not take on an average more than half a day a week for each $5,000 done, and the greater promptness and certainty of collections and the checks against overcharges will more than save this half-day. The printer has, besides, the knowledge of exactly how his business is going. Books should be begun by a professional bookkeeper; and if the printer has no acquaintance with bookkeeping methods he had better call in an experienced man once or twice a week until he understands how the work should be done, and can do it himself with accuracy. In the meantime he should remember that everything that is paid out or taken in must be entered on his books somewhere, and that what he himself spends or uses should be placed there the same as everything else. He puts in his cash-book all he has received, and in his expense account all he has paid out.

Bills Receivable.

1891.		
Aug. 27.	Jones & Co.	$227.40
Oct. 12.	W. H. Harbison	57.65
Nov. 13.	T. R. Glenny	112.27

Bills Payable.

1891.		
July 6.	T. D. Dakin	$125.00
July 29.	Jones Paper Company . . .	244.00
Sept. 6.	T. D. Dakin	125.00
Oct. 7.	Harris & Dill	71.25
Nov. 6.	T. D. Dakin	125.00

BILL-BOOK.—One very important account to be kept, if the printer buys largely beyond his means, is that which shows how his notes stand. Unfortunately printers are sometimes compelled to take notes for debts. If they could obtain them the moment the work was delivered they would be advantaged by notes, but they commonly only receive them after they have dunned their customer for three or four months, and he gives the notes to be free from them for two or three months more. If the printer gives notes himself, he should have a reminder of this fact, so that he cannot forget it, no matter how busy he may be. All merchants keep what they know as a bill-book, in which bills receivable and bills payable form the two divisions. Nothing can be more necessary to them, and a similar one would be of advantage to a printer, although, as the number will be small in proportion to his total transactions, the space needed will not be very great. Such a book will look as in the example on the previous page. It is unnecessary to have it more in detail.

It is not necessary to foot up these pages, except to see how much has thus been received or paid out in the year, as the actual amount thus handled appears elsewhere in the cash-book and the ledger. Its value is as a reminder.

This question of bookkeeping should not be left without alluding to the opportunities which are presented to dishonest clerks or foremen to deceive their employers. Little of this can be done if the employer is vigilant in attending to his own business, but much may be and is done when he neglects it. Defalcations and wrong accounts among trusted men in printing-offices are by no means so uncommon as they are supposed to be. They are of three kinds, collusions with outside persons, shortages and wrong keeping of the accounts. The petty cash is the easiest in which to deceive. A dollar and a half may have been paid for cartage and one and three-quarters charged ; postage-stamps may have been purchased for sixty cents and eighty cents put down. It is hard to put any systematic check on this. The security the employer has must be in the personal integrity of his representative. If he has any doubt, it would be better to employ a new man. Great rogues, however, usually are correct in these little things. One chief attack they make is on the bank account. They report deposited in the bank so many dollars, whereas there are less. When the deposits are sent over in the afternoon the amount is correct on the slip, but after it has returned a figure is added or one changed. Thus the deposits might be $81.42. By putting a figure 1 before it will be $181.42 ; or by changing the 81 to 84 by adding another stroke it will seem that there is more money in the bank than there really is, the bookkeeper having taken the necessary amount of cash to make the money in the drawer correspond. This is very short-sighted, for it will be discovered the moment the book is written up. Bills when sent out are frequently paid at once by those who are not likely to call in person or to have correspondence with the office. It can be reported they have not paid, or that they have paid a smaller amount than the true one. Of course the money is replaced a little further on by other moneys obtained in the same manner. Some doubtful customers do pay, even after they have been given up. The bookkeeper receives the money, but says nothing about it, and the account is turned over to profit and loss. A case in point which happened in New York was where every entry was properly made, but eleven times in one year a false addition was set down, representing $100 more as spent than was really the case. The proprietor was a vigilant man, but he never thought of footing up the columns. By accident he did so one day and found an error. He tried a second page, and stumbled upon another that had been falsified. The method of preventing all these attempts at deceit is to take an active part in the business, open the letters, examine the deposits and the bank-book, and to make monthly statements to customers. Doubtful accounts, after the ordinary course has been pursued with them, should be put in the hands of a bill collector. The dishonest bookkeeper who took a hundred dollars at a time would probably have been found out if the books had been kept by double entry. Receipts should be sent by mail more largely than is the practice now.

Another system of defrauding is by collusion with a customer or one who sells goods to the house. Ink firms have long been in the habit of paying commissions, but charging more for their inks than they are worth, and fraud is known in other branches of the trade. There is less difference in inks made by one firm and those made by another than is generally imagined, and it is commonly safe to try ink even from an unknown concern. The purchaser should be the master printer himself, and not a subordinate. Clerks who are to collect sometimes make out two bills, one at the real amount and one a little higher, pocketing the difference, and there are also cases where buyers have agreed, in case the work could be done for a certain small amount, much below its proper value, that a commission would be given to the employee, or that he should receive an expensive present. The only security against these things is vigilance and keeping the control of affairs in the proper hands.

Further information concerning this important subject will be found under the heads of ADVERTISEMENTS, COMPOSING-ROOM, COST OF PRODUCTION, COUNTRY NEWSPAPERS, CUTS, ESTIMATES, INVENTORY, MAILING, NEWSPAPERS, PRESSROOM, PUBLISHING, STEREOTYPES, WAREHOUSE and WEAR AND TEAR. Almost every subdivision of the trade has its own special books and method of keeping its accounts, not only for monetary reasons, but to facilitate work. There are no special books on bookkeeping for printers.

Booklets.—An affected term for short or small books or pamphlets.

Bookmaker. — One who makes or manufactures books. This term is sometimes applied to the author or compiler, but it is now most generally used of those who are engaged in their material manufacture. The Century Dictionary defines it as "a printer and binder of books." It was thus used in the Paper Trade Journal in 1873, and is supported by a long array of examples going back into the last century, and was one of the terms used in Shakespeare's time and before. The idea of a book is older in English than that of authorship, as is shown by the word itself, book being from the same root as beech, an indigenous English word, while author is from the Latin, coming into English from the French auteur. The first definition given of book in the Century Dictionary is really that of a legal document, in which authorship or compilation did not exist. Under the term liber lawyers now include the great quartos and folios in which conveyances and mortgages are recorded, and books of account or blank-books are those in which no thought at all is expressed by the work when ready for use. An analogy similar to this is that of a copybook or hornbook, the former having nothing written or printed in it, and the latter having only the letters of the alphabet and the Lord's Prayer. All these are books, and the articles which resemble books are also frequently so called, as for instance, pocket-books. It was, therefore, a natural analogy which led early authors to call those who made books—the printers and binders—bookmakers, and in one instance, as in the manufacture of pocket-books, just mentioned, the workmen in this occupation have continued to be known as pocket-book makers. The earlier and more direct forms of English, which led the writers of Caxton's and Spenser's time to speak of bookmakers, fell into disuse after a certain time, nor was the term again brought into popular currency until within a few years. It now bids fair, however, to be a permanent revival. Since its adoption by the American Bookmaker in New York and the British Bookmaker in London the idea has been taken up by many extensive printers and binders, who find in it something which expresses their art better and more comprehensively than printer or binder did, for in this word both of them, with several ancillary arts, are united. In its range it includes every process for producing anything printed, bound or engraved, as well as the results—the handbill, newspaper, card, bank-bill, stereotype-plate, portrait, memorandum-book, show-card or dictionary. As Buchdruckerkunst in German applies to everything relating to printing, so bookmaking means every method of reproducing or getting ready to reproduce by impression any graphic idea and of fastening together and covering sheets of paper.

Book-Paper.—Paper above the lowest quality and used for printing books. It is also used on jobs and on some newspapers. Good book-paper should be perfectly even, smooth and strong; it should show no flecks or flaws when held up to the light, and should theoretically be of a pure white, neither inclining to yellow nor blue, but in practice it is found to be a little more yellow than otherwise. Tinted book-paper is, however, used, and is colored by treatment in the engine. Highly-sized paper is not a book-paper, but the better grades usually contain some size. It may be machine finished or calendered, the latter being the highest grade, this being done in the machine. Hand-made papers are rough in comparison with machine-made, yet a roughness can be imparted to the latter artificially. Very little hand-made paper is used. Unless trimmed, it is deckle edged. The operation of calendering is in effect crushing down the prominences in paper. As made naturally it is filled with little depressions and eminences, occasioned by the differences in the material and the interlacing of the fibres. When submitted to great pressure between hard and smooth rolls the projections are forced down and spread laterally, thus making the hollows less distinct than they were before. This causes the paper to be as smooth as is required for any ordinary purpose, but for shallow process cuts, and for interpreting fine lines well in other engravings, a still smoother surface is needed, which is obtained by coating the surface with china clay or similar substances. This material being impalpably fine enables a face to be given which is as smooth as it is possible for the art of man to make, and such paper is in general use on illustrated magazines and books. It is somewhat heavier than other paper of the same dimensions, and also costs more by the pound. The most common size of book paper is 24 by 38, which will print sixteen pages of ordinary octavo on one side; yet it is made much larger, the largest size generally kept in stock being 32 or 33 by 46, which are the dimensions of Harper's Weekly. Duodecimo is most commonly printed on 23 by 41. Odd sizes must generally be ordered from the paper-mill, which will make them without extra charge. In a fine book it is essential to get all the paper required at one time, as the tint can never be exactly duplicated. See HAND-MADE PAPER, JOB-WORK, NEWS, PAPER and WRITING-PAPER.

Book-Perfecting Press.—See PERFECTING-PRESS and PRESS.

Book-Plates.—1. The prepared metal plates from which a book is printed. 2. An engraved or printed label, placed in the beginning of a book to show ownership. Many are very beautiful. See under EX-LIBRI.

Book-Press.—The warehouse screw-press which was used previously to hydraulic presses for pressing books. See STANDING PRESS.

Book Quoins.—A medium size of wooden quoins in England, the larger kind being called news quoins. No such distinction is known in America.

Book-Room.—A composing-room in which bookwork is executed. Outside of our six or eight largest cities, book-printing in its strictest sense, the product of which is sold over the counters of booksellers, is not done, but usually towns of fifty thousand inhabitants, and many of a smaller population, have one or two offices where books are printed. In addition to this, almost every newspaper has a job office attached, and there are many independent job offices in the United States, all of which do more or less pamphlet work. Under this head are included law cases and briefs, advertising primers, guide-books, descriptions of manufacturing establishments, catalogues and price-lists. Some of these are of great size. There is thus very much work done that would come under the rules of a book office. The largest quantity of this kind, taking the whole of the country through, is law work. That is generally executed in small pica, although pica is occasionally used. Long primer is very much employed on miscellaneous work. In these two sizes, long primer and small pica, fully one-half of the whole is executed. Next will come brevier, and in the third place nonpareil. A book-room having 2,000 pounds of small pica and long primer each should have 800 of brevier, 500 of nonpareil, 250 each of agate, minion and pica, with 50 each of English and pearl. It would not be necessary in an office of this size to have any bourgeois. An office having 15,000 pounds of book type would probably have three faces of type in small pica and long primer, and two in each of the other sizes, including bourgeois. With 30,000 pounds there would be four faces where there were before three, and three where there were two; and with 60,000 pounds five faces to those that had four before, and four where there were three, except in bourgeois, minion, pearl, agate, diamond, pica and English. It can scarcely ever be necessary to go beyond five faces, and no matter how large the office is it must be counted a serious defect when they rise to nine and ten. Large offices must keep their letter-press and electrotype type separate, on account of the face alone, regardless of the high spaces, and it is the practice of the two offices in New York which have the most type to copperface a font, if the duplicate, which has been used some time, is barefaced. The next font reverses this, and so on. By this means the faces can readily be distinguished apart. Copperfacing is also advantageous in other respects.

Leads should not be provided of other sizes than six to pica, except in those offices which do publishers' work. These should be cut to pica ems and ens, the greatest quantity in the sizes most used. These vary in regular sizes from about twelve ems pica to thirty-eight, but there are occasions when smaller ones are needed, and it may sometimes happen that a larger one is required. Slugs should be in abundance, of nonpareil and pica. There must also be much metal furniture to make up forms. Wooden furniture has had its day, and while a supply of it is desirable in case of an emergency the main reliance should be on metal. The chases are of wrought-iron. In a large office the shifting bar should not be used. Let extra chases be provided, and let them be welded in. On law work, if that is prominent, cast-iron chases, with the wide centre-bars and head-pieces cast in, are the most convenient. Ample provision should be made for stowing away galleys, for proving them, and for keeping the papered-up matter in a safe place. It is a good plan to have the stones in the middle of the room, and range the compositors at the side. Proof-readers need a light corner and yet one not too cold in winter. Vaults are required for the storage of plates. The ordinary measures for bookwork in England differ a little from those in America, as the sizes of paper differ. The following are the common widths and lengths of pages there in pica ems: Foolscap quarto, 41 by 30; foolscap octavo, 32 by 18; foolscap 12mo, 28 by 15; foolscap 16mo, 19 by 15; crown quarto, 48 by 34; crown octavo, 36 by 21; crown 12mo, 32 by 16; crown 16mo, 23 by 16; demy quarto, 54 by 42; demy octavo, 42 by 24; demy 12mo, 36 by 19; demy 16mo, 26 by 20; demy 32mo, 21 by 12; royal quarto, 64 by 48; royal octavo, 48 by 27; royal 12mo, 40 by 21; royal 16mo, 29 by 21; and royal 32mo, 24 by 14. These would take leads of 12, 14, 15, 16, 18, 19, 20, 21, 24, 27, 30, 34, 42 and 48 ems in length. The sizes of pages in American book offices are, for imperial octavo, 31 by 54 ems; super-royal octavo, 27 by 46; medium octavo, 24 by 42; crown octavo, 22 by 35; medium 12mo, 21 by 33; medium 16mo, 19 by 29; medium 18mo, 16 by 28; medium 24mo, 14 by 24; and medium 32mo, 12 by 22. These are the sizes for publishers in the trade, but pamphlets are usually made up to regular sizes of paper, such as can be bought easily in the market. To some extent the dimensions are regulated by fancy. The following are the most usual

DIMENSIONS OF PAMPHLET PAGES OF TYPE.

Sizes.	Flat Cap, 14 by 17 in.	Folio Post, 17 by 22 in.	Medium, 19 by 24 in.	Super-Royal, 22 by 28 in.
	Ems pica.	Ems pica.	Ems pica.	Ems pica.
Folio . .	34 × 65	44 × 76	49 × 86	57 × 99
Quarto . .	29 × 37	34 × 48	40 × 52	46 × 60
Octavo . .	16 × 33	22 × 38	24 × 42	28 × 50
12mo . .	14 × 26	17 × 33	19 × 36	22 × 42
16mo . .	15 × 18	18 × 23	20 × 26	23 × 30
18mo . .	12 × 20	14 × 25	16 × 28	19 × 32
24mo . .	12 × 15	15 × 19	16 × 20	14 × 32
32mo . .	9 × 15	11 × 19	12 × 22	14 × 24
36mo . .	9 × 12	11 × 16	13 × 17	15 × 20
48mo . .	. . .	. . .	9 × 18	11 × 25
64mo . .	. . .	. . .	10 × 13	14 × 14
72mo . .	. . .	. . .	8 × 14	11 × 13

Bookseller.—One who follows the business of buying and selling books. Except in the larger cities he nearly always unites some other calling with it, as the profits are small and few books are bought as a rule, the newspapers, magazines and cheap literature taking away his customers. In the older works booksellers are synonymous also with publishers. Every bookseller issued some books on his own account. It was a practice in the last century, and was continued to some extent in this, for several booksellers to join in the publication of a work, dividing expenses and profits, and those works were very generally delivered to them in sheet form. Dr. Johnson's Dictionary was thus brought out, and so were some of the earlier volumes of Scott, when they were reprinted in the United States. A Bible in the office of the New York Typothetæ, printed by George Long in New York in 1813, was published by Evert Duyckinck, John Tiebout and G. & R. Waite of New York, and Websters & Skinner of Albany. The entire venture for the edition was probably not beyond $6,000. J. & J. Harper printed many works in this way, being also interested as publishers in some of them.

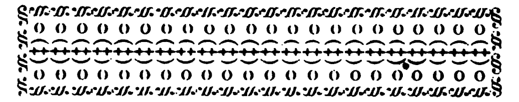
Bookworms.—Worms which burrow in the covers of books. This insect has occasioned much trouble to the owners of libraries, as it is very difficult to discover it and it has generally completed its ravages before it is noticed. Zaehnsdorf, the London bookbinder, has been able to get possession of several. Viewed under a microscope the grub might be a miniature moth, while the fully-grown beetle is a perfect reduction of the familiar large black beetle. It feeds upon paper in captivity and seems to grow and thrive upon it.

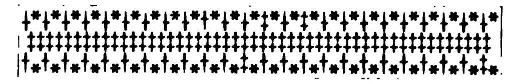
The method of getting rid of these pests is by making the binding of such a material that it is repugnant or deadly to them. Substances like aqua-fortis evaporate, and the worms again make their appearance. The paste is a great temptation to them, but if something is put into it that is repulsive they will not attack the books. A mineral salt, like alum or vitriol, has much effect. Alum is not, however, a perfect preservative. Rosin is employed in the same way, but oil of turpentine has a greater effect. Anything of strong odor, like anise-seed or bergamot, mixed perfectly, but in small quantities, preserves the paste for an unlimited time. Make a paste with flour, throw in a small quantity of ground sugar and a portion of corrosive sublimate. The sugar makes it pliant and prevents the formation of crust on top. The sublimate destroys insects and fermentation. This does not prevent moisture gathering, but two or three drops of oil are sufficient for this purpose.

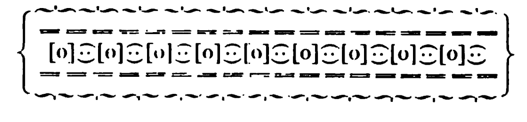
Boomer Press.—A standing press in which the power is obtained by a combination of four levers working upon toggle joints, through which pass a right and left hand screw. The rotation of these screws causes the two joints to approach or diverge, according to the direction of such rotation, with a perfectly uniform motion. This press possesses several advantages over both the ordinary screw and the hydraulic presses. The pressure once applied cannot yield, so that the material is in no way released, and can, therefore, receive a finish in less time than when under hydraulic pressure. The construction is simple and not liable to get out of order. The power accumulates with every turn of the screw, the movement of the platen being rapid at the beginning but gradually becoming slower as the power increases.

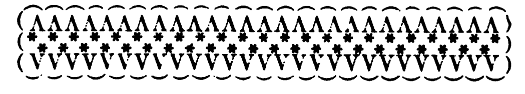
Booth, Jonas, an ingenious printer, was born in England in the latter part of the last century, and came to New York about 1822. Aided by his recollections of the presses he had seen in England, he built a machine in 1823 upon which was printed an edition of Murray's Grammar. This was the first machine press in New York. A few years later he built at Worrall's another press which was used upon the Courier and Enquirer for some time. In 1826 or 1827 he began using composition rollers, casting them himself. They had previously been unknown on this side of the water. He also made his own inks. His first printing was of books, the second of lottery tickets and bills, and finally it was theatrical work. In this he was the American pioneer. He had a large family, and brought up his sons to his own occupation, dying about 1850.

Border.—The geometrical, arabesque or purely ornamental characters cast upon types and intended to be used in combination with each other, usually around a page. They were formerly known as flowers, and skill in their management was regarded as excellent proof of proficiency as a workman. They are not now in as much favor as forty years ago, but are still extensively employed in particular places in combination with brass rule. Many more faces are now known from which to select, and the styles are better. When a page has a great deal of blank space in it, or when the lines are short and ragged, a border frequently answers a very valuable purpose. Formerly borders were used to construct head and tail pieces, to surround initial letters, and to divide miscellaneous subjects, both in books and newspapers. Smith's Printer's Grammar, published in London in 1755, shows a number of designs made out of type and brass rule for this purpose, as follows:









Bordereau (Fr.).—The bill; the reckoning.

Border Lines.—The red lines used on the margins of pages of books. The favorite thickness is pearl.

The printing is done before the body of the pages has been begun, and as it is all alike the lines need not be taken off till all the paper for that volume is printed. Offices that do much of this kind of work have sets of these rules brazed together, or electrotypes of them.

Boss.—A projection. In bookbinding, brass or other metal ornamentation fastened upon the covers of books, for decoration or preservation.

Boston.—This was the second town in the present Union in which printing was practiced, the original professor of the art there being John Foster, who was specially authorized by the government to set up a press. It is not supposed that he was himself acquainted with printing, but he employed workmen for that purpose. The earliest production from his press that was known to Thomas was published in 1676, and the latest in 1680. He was succeeded in the management of the press by Samuel Sewall, the court, in October, 1681, giving the proper authority. He was a lawyer, and his memory is preserved through his participation in the trials of the witches at Salem, with the solemn confession subsequently made of his errors in connection therewith, and by his Diary. He was released from the management of the printing-office in 1684. Glen next followed, and then Samuel Green, Jr., succeeded by Richard Pierce and Bartholomew Green. The latter printed for John Campbell, the postmaster, the first regularly-issued newspaper in the British colonies. It was entitled the Boston News Letter. A single number of a newspaper had, however, been printed years before. Green continued in business for nearly forty years. There, too, Benjamin Franklin began the art with his brother, James Franklin, serving several years at the trade.

Among the other printers in Boston before the Revolution were John Allen, Timothy Green, James Printer, Thomas Fleet, Samuel Kneeland, Timothy Green, Jr., Bartholomew Green, Jr., Gamaliel Rogers, John Draper, Zechariah Fowle, Benjamin Edes, John Green, Richard Draper, Daniel Kneeland, Isaiah Thomas, Joseph Greenleaf, Margaret Draper and John Howe.

For many years Boston continued the chief place in the colonies for publishing. It preceded Philadelphia in the use of types by nine years, and New York by seventeen. The next place in New England was New London, Conn., where printing began in 1709. Until the year 1760 more books were printed in Massachusetts annually than in any of the other colonies, and before 1740 more printing was done there than in all the other colonies. After 1760 the quantity of printing done in Boston and Philadelphia was nearly equal till the commencement of the Revolutionary War. Many newspapers were also published there.

After the Revolution the town was, as before, a centre of printing, and for a long time the Columbian Centinel, established there in 1784 by Benjamin Russell, was the chief newspaper. The Polar Star and Boston Advertiser was the first daily in 1796. It failed, and was succeeded by the Federal Gazette and Daily Advertiser in 1798. Many eminent printers carried on their art during the first half of the century. Power-presses were put into extensive use there earlier than in any other American towns; type-founding began in Boston in the second decade of the century, as well as stereotyping, and in it for many years was manufactured the Adams press. Daily newspapers multiplied, and book publishing became a great interest. There have always been more authors resident in that vicinity than anywhere else in the Union.

The Faustus Association of Boston was the first organization of employing printers in America. Three or four printers happened accidentally to meet in the office of Munroe & Francis, and after talking over the evils to which the profession was exposed asked Mr. Francis to call a meeting. It was held on July 16, 1805, at Vila's Hotel. David Carlisle was the president, and David Francis the secretary. A committee reported on August 2 a constitution for the "Society of Printers in Boston and its Vicinity," which established a scale of prices for composition and presswork, and certain rules to be observed in relation to apprentices and journeymen. At the first annual meeting Benjamin Russell was elected president and David Francis secretary. They continued to hold these offices until the dissolution of the society, about 1815. It made great exertions to secure improvements in the manufacture of paper, recommending the exposure of all frauds in counting, the interpolation of imperfect sheets and the selling of broken quires. The quality of ink was examined, that made by J. M. Dunham, at Cambridgeport, being recommended as the best. Some type from Binny & Ronaldson, of Philadelphia, was complained of as of bad quality, and a chemist was employed to analyze it. He reported that the Scotch type was the best, the English less so by 15 to 20 per cent., and the American had an alloy surprisingly great. The members of this society, the first Typothetæ in America, were the most eminent printers of the early part of the century in Boston, their names being as follows: Benjamin Russell, David Francis, William Manning, Joseph T. Buckingham, Samuel Gilbert, Edmund Monroe, Ensign Lincoln, James Loring, Thomas Minns, Alexander Young, William Hilliard, David Carlisle, Andrew Newell, John Park, John Russell, James Cutler, Ebenezer Rhoades, Joshua Belcher, Samuel T. Armstrong, Josiah Ball, Samuel Etheridge, Isaac Munroe, Joseph Cushing, Hosea Sprague, William Greenough, Chester Stebbins, Benjamin True, Edward Oliver, Thomas Edmands, Jr., John Prentiss, Isaiah Thomas, Thomas B. Wait, Ephraim C. Beals, Eleazar G. House, Andrew W. Park, Eliab W. Metcalf, Robert Lilly, Davis C. Ballard, Nathaniel Willis, George Titcomb, Samuel Avery, Daniel Bowen and Abel Bowen.

About 1863 the Massachusetts Franklin Club, composed of employers, was begun, and in 1887 the Boston Master Printers' Club. Of this Henry O. Houghton, of Cambridge, is the second president, succeeding Horace T. Rockwell; and Louis Barta the second secretary, succeeding J. Stearns Cushing.

The newspapers and periodicals of Boston have long been conducted with great ability. Two of them, it is understood, each circulate over a hundred thousand copies daily. Boston has nine dailies and 231 other periodicals. There are many lithographers, bookbinders, engravers and steel-plate printers, and three or four type-foundries.

Botanical Signs are not frequently used. A few may be noted, however. An asterisk (*) signifies that there is a good description given in the reference table in the work; a dagger (†) implies in this relation some doubt or uncertainty; an exclamation point (!) denotes that an authentic specimen has been seen by the author named, and a mark of interrogation (?) indicates a doubt. There are also certain arbitrary marks, borrowed mostly from mathematical and astronomical signs.

Botch.—An incompetent workman.—*MacKellar.*

Botcher.—A bad or careless workman.

Bottle-Arsed.—Type larger at the bottom than at the top. This was once much more common than now, and the name has gone out with the thing. It was occasioned by imperfect casting, and also by the action of the press upon spongy, porous type, which was thus forced down and spread out.

Bottle-Necked.—Type thicker at the top than the bottom—the reverse of bottle-arsed.

Bottom Boards.—The lower or taking-off boards of a printing-machine.

Bottom Line.—The last line of the page. When there were catch-lines, it was the last line before them.

Bottom Notes.—Foot-notes are sometimes thus called, to distinguish them from side-notes.

Bottom of Tympan.—The stud on the frame which the hook catches upon in order to hold the inner and outer tympans securely.

Bound.—The term for books when in covers—cloth or otherwise—as distinct from books in quires.

Bouquiniste (Fr.).—A dealer in second-hand books, who generally has a bookstall at some street corner.

Bourdon (Fr.).—An out.

Bourgeois, pronounced burjoyce, a medium-sized kind of type, less used than some others, which is in magnitude between brevier and long primer. By the point system it is called nine points. About eight lines make an inch. It is half great primer in body and twice diamond. Few display types are made to it. This is named gaillarde in French, burgeois in Dutch, Bourgeois in German and gagliarda in Italian.

This line is set in Bourgeois.

Boustrophedon.—Characters written from right to left, then returning from the left, as plowmen make their furrows. This was the method the Greeks followed in their earliest ages. It was disused by them four centuries before the Christian era, but was used by the Irish at a much later period.

Bourier, John, a native of France, came to this country in his fifteenth year, and shortly after entered the printing trade. After completing his time in Philadelphia he began business on his own account, but subsequently devoted himself to the study of law, achieving a high reputation as an author. His principal works were an Abridgment of Blackstone's Commentaries, a Law Dictionary, Bacon's Abridgment of the Law, in ten octavo volumes, and the Institutes of American Law. He became recorder of Philadelphia and judge of the Court of Criminal Sessions, and in each achieved honorable distinction. He died on November 18, 1865.

Bow the Letter.—When compositors pick a bad letter out of a form in correcting it is usual to rub the face of it on the stone and to bend the shank, if it be not a thick letter; this is done to prevent such letters being distributed and used again. In Moxon's time it was styled bowing a letter. After the form is locked up and the stone cleared these bowed (or bent) letters are thrown into the shoe.—*Savage.*

Bowdler, Thomas.—This gentleman, who was born in 1754 and died in 1825, will always be remembered for his attempts to purify Shakespeare of his immoral or obscene passages and Gibbon of his deistical expressions. The efforts were failures, as people wish to see what these authors really wrote, but Bowdlerizing remains as a word in the language.

SAMUEL BOWLES.

Bowl. — A small wooden bowl which was formerly in use in England in composing-rooms. It contained water, which could be carried to different parts of a room for the purpose of wetting matter.

Bowles, Samuel, a printer and editor, of Springfield, Mass., was born there on February 9, 1826. His father, who was a printer, had gone to that place from Hartford, and established a weekly paper called the Republican. The son learned to set type and did all the other work about a country newspaper office, frequently helping also in the preparation of copy. In 1844, when he was eighteen, he persuaded his father to begin the daily Republican, which he himself carried on, the first number being published on March 27. It displayed unusual vigor and skill, and the Mexican War coming on soon after largely extended its circulation. For many years it had both the largest circulation and the largest revenue of any newspaper published in a small town in the United States. In 1853, the elder Mr. Bowles having died, Clark W. Bryan was added to the firm, and under his superintendence a large book and job office was built up, and for a long time they were extensive manufacturers of albums. In 1857 Mr. Bowles took charge of a newspaper started in Boston, but soon returned to Springfield, and in 1865 made a trip to the Pacific shore with Speaker Colfax, which he afterwards described in a published book. He died on January 16, 1878. His life by George S. Merriam appeared shortly after. The business is still conducted by his son and others.

Bowyer, William, a printer of London, was born in that city in 1663, being the son of John Bowyer, a grocer. He was bound an apprentice in 1679 to Miles Flesher, and was admitted to the freedom of the Company of Stationers on October 4, 1686. He was one of the twenty printers allowed by the Court of Star Chamber, but this privilege was at that time drawing to a close. In 1712 he was burned out, the loss of property being estimated at £5,148 18s. This represented a much larger establishment in proportion than could now be set up for the same money, as a dozen presses, each employing two men, could be purchased for the same sum that is now required to buy a single cylinder. A subscription paper was soon after circulated among his friends, which brought him in £1,162 5s. 10d., while a royal brief, which seems to have been some kind of insurance, added £1,377 9s. 4d., thus making the total amount £2,539 15s. 2d. With this sum he again began business, and was, as he had been before, very successful. He died on December 27, 1737, and it is recorded that the funeral expenses were £37 10s. He was succeeded by his son, William Bowyer the second, who had been a partner with him from 1722. A marble monument was erected to him in Low Leyton, in Essex, and there is a brass plate with an inscription to his honor in the Stationers' Hall.

WILLIAM BOWYER, THE YOUNGER.

Bowyer, William, the younger, entitled by Hansard the most learned and distinguished printer of modern times, was born in White Friars, London, on December 19, 1699, and received his education at Merchant Taylors' School and St. John's College, Cambridge. He then entered his father's business, paying principal attention to the correcting of proofs. He was twice married. His second wife, Mrs. Elizabeth Bell, was originally his housekeeper, but after her marriage she so applied herself that she finally became able to read the most learned works that went through the office. She was an extraordinary woman, and was highly appreciated by his friends, as her modesty equaled her acquirements. In 1729, through the friendship of the Speaker of the House of Commons, Onslow, Bowyer was made printer to that body, a position which he held for fifty years. In 1736 he was elected a member of the Society of Antiquaries, and appointed their printer. In 1736 he took into partnership John Nichols, who had been educated by him, and the next year was made printer to the House of Lords. His learning was unquestionable, and he was a man of great accuracy. He published several pamphlets and edited several learned works. He died on November 18, 1777, and was buried at Low Leyton, Essex. Mr. Nichols, his partner, published a biographical memoir of him in his Literary Anecdotes of the Eighteenth Century. By his will Mr. Bowyer devised several annuities to worthy journeymen printers, under the direction of the Company of Stationers.

Box In.—A term used in England to indicate that rules should be placed around a page, like a border.

Boxed.—Any figure or other work inclosed within a border of brass rules; more generally known now as paneled.

Boxes.—The subdivisions of a case, in which particular letters or characters are laid. They are of four sizes in the lower case, the a being the standard. It is nearly square, while other boxes are half, and still others quarter sized. The e is one-half larger than the a.

Boxwood.—The wood chiefly used by engravers. Occasionally in former times pearwood was used, and now pine is much employed for posters. But for all fine work boxwood is required. The best boxwood used in engraving is of a good yellow color, of a fine, close grain that has been of a slow growth, clear of knots and any imperfections, such as cracks or flaws. The finest lines may be engraved on this wood, as it is both hard and tough, and with care in printing the number of impressions that may be taken from an engraving on it would appear incredible. Papillon, in his History of Engraving on Wood, gives a specimen from which he states there had been upwards of three hundred and seventy thousand impressions previously printed, and if the block had been carefully cleaned and well printed it would still have produced respectable impressions. Boxwood of a dull but yellow color and of an open, coarse grain is not fit for engraving; neither is wood that is of a blackish color at the heart, for in these cases it has begun to decay, is brittle and tender, and if engraved on the lines would not stand, but would fail in printing. Our principal supply of boxwood comes from the Levant, and is called Turkey box. This material was first employed in America by Dr. Anderson.

Boxwood Shooting-Stick.—A locking-up stick made of that particular kind of wood.

Boyer or **Boyet,** a distinguished family of binders in France, who flourished from 1670 to 1730. By them the backs of the volumes were more elaborately gilded than the sides, large blank spaces being left there; but this by no means states all the new ideas introduced by them.

Boyle, William Kent, a printer of Baltimore, was born there on April 6, 1816, and received a common-school education. At sixteen he entered the office of John D. Toy, whose father established the business in 1795. This was then the leading book and job office of the city. Shortly after completing his time he was made foreman, and in 1865 he became proprietor. He was a member of the Methodist Episcopal Church, and lived an active Christian life. Many of his apprentices are still in the business. He died in 1884, being succeeded by his son, J. Young Boyle, now the president of the Baltimore Typothetæ.

Bozza, Prova (Ital.).—Proofs.

Brace Pliers.—An implement used for curving brass rule in making braces.

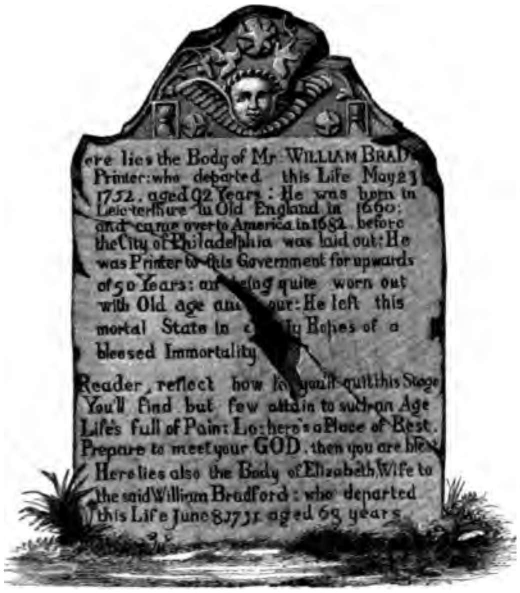
Braces.—Characters used to combine two or more separate items together, as: ⏟. They are ordinarily made of two or three ems in length, but were formerly cast by American type-foundries as long as six or seven ems. Braces are also made in parts, so that they may be combined, the parts once being known as cocks and hens, as: ⌜ ⌃ ⌝. By putting in en, em or two em dashes between these parts they can be made of any length, as for example: ⌜——— – ⌃ – ———⌝. Brass braces are considered more ornamental, and can be had of any length, as:

As these were made fifty years or more ago, the swell was exactly conformed to the size of the brace; thus the ten-em brace was far thicker in the swelling portions than the six-em brace. This caused a lack of harmony in the page. When only one is to be used in a job, this can make no difference, but to avoid this irregular appearance founders also make light-faced dashes. The face of a brace is always turned to the side which has the most lines. When a two or four em brace has only one or three lines on the back, en quadrats are laid on their side above and below, to fill out the space.

Bracket.—A sign of punctuation, thus: [or]. It indicates an interpolation.

Bradford, Andrew, a printer of Philadelphia, was the younger son of William Bradford, who first introduced printing in the Middle Colonies. He was born in 1686, soon after his father had settled in Philadelphia, and learned his trade of him in New York, to which city they had removed in 1693. He changed his residence to Philadelphia in 1712, but had been in partnership with his father in New York the previous year, and continued printing in Pennsylvania until his death, November 24, 1742. He was the only printer there until 1723, Keimer then beginning, and hospitably gave shelter to Franklin on his arrival in Pennsylvania, as his father had previously done in New York. He was not a match for Franklin in a business sense, however, when the latter began for himself, and after that time occupied the second place, although doing well. On December 22, 1719, he established the American Weekly Mercury, which was the first newspaper in the province or in the Middle Colonies, and in 1741 the American Magazine. He was postmaster from 1728 till 1737, and became a bookseller in 1735. It shows the ability and judgment of Bradford that, with the hostile competition of Franklin, the greatest name of our colonial history, he kept on his course successfully, and left a comfortable fortune. Thomas records that his typography was equal to Franklin's. He was twice married, the second time two years before his death. Mrs. Bradford continued the business for a short time after this event, when Isaiah Warner became a partner, under the firm-name of Isaiah Warner & Cornelia Bradford. William Bradford, Andrew's nephew, began business in 1742, on the death of his uncle, and continued it till 1791, although his office was closed during most of the Revolution. He was in the military service of the patriots, and finally became a colonel. He died September 25, 1791. His second son, William, studied law, and became the attorney-general of the United States. Thomas, the eldest son, had been in partnership with him since 1766, and continued the business. The latter was born May 4, 1745. Until about 1800 he conducted the newspaper founded by his father in 1742, and a daily newspaper afterwards until 1814. The office was at that time, as it had been for three-quarters of a century before, at No. 8 South Front street, and business was continued there by some members of the family until about 1825. Another member was in the paper trade in New York as late as 1845. It appears, therefore, that this family was connected with the art of printing in America during an unbroken period of a hundred and sixty years.

Bradford, William, the first printer in the Middle Colonies, was born May 29, 1663, in Leicestershire, England. He was apprenticed to Andrew Sowle, a Quaker printer in Gracechurch street, London, who had suffered persecution for his faith. Before his final departure for America he married his master's daughter, his first visit having been made in company with William Penn, when the foundations of Philadelphia were laid. On his return to this country he brought with him some second-hand type, and set up his office "near Philadelphia," but where is not exactly known. His first work was the Kalendarium Pennsilvanieuse, an almanac for 1686. He had several difficulties with the local government during the next seven years, but in 1692 he espoused the side of Keith, a Quaker, who had arraigned the magistrates for their abandonment of Friends' principles, in fitting out armed vessels to put down piracy. He printed pamphlets taking Keith's side, and for issuing one of them was thrown into prison, his tools being taken from him, and not wholly restored for months after. Colonel Benjamin Fletcher, who became governor of both Pennsylvania and New York about this time, had won considerable applause from his friends for his rapid march to Albany to drive away the Indians from the northern frontier, and was desirous of having a printer describe his exploits in print. He therefore ordered Bradford's tools returned to him, and caused him to be made the public printer of New York, to which colony Bradford removed early in 1693. The appointment entitled him to draw a salary from April 10, 1693, which may therefore be considered the date of the beginning of the art in New York. Some antiquaries believe a proclamation in Dutch and English, asking benevolent people to contribute towards ransoming two New Yorkers, then slaves in the hands of Barbary corsairs, to be his first production, but Dr. George H. Moore esteems the narrative of Fletcher's exploits the first. Bradford soon began printing the laws of the colony, which appeared in a great volume in 1694; in 1710 he published the Common Prayer Book, being assisted by Trinity Church, and he also issued many other works. In 1725 he published the New York Gazette, the first newspaper in the colony. After settling in New York he became an important man in Trinity Church and one of its wardens, as he had abandoned the Quakers. A little later than 1725 Bradford began a paper-mill at Elizabethtown, N. J., as he had before helped to establish one near Philadelphia, on Paper-Mill Run. He had two children. Andrew was brought up to his father's trade, and the other was employed in it for a while, but went to sea on account of his health, and when he came back became a plumber. Bradford probably died at the house of this son, whose name was the same as his own. It was on Hanover square, about where the office of W. R. Grace & Co. is at present. The date was May 23, 1752. He left no estate. The stone represented in the illustration was over his grave in Trinity churchyard, New York. Two centuries after his birth the New York Historical Society and Trinity Church joined in celebrating his anniversary, an appropriate address being made by John William Wallace of Philadelphia, in which many interesting historical facts were given. Shortly after this the stone was taken down and a new one erected.


ere lies the Body of Mr WILLIAM BRAD
Printer: who departed this Life May 23
1752. aged 92 Years: He was born in
Leicestershire in Old England in 1660;
and came over to America in 1682 before
the City of Philadelphia was laid out: He
was Printer to this Government for upwards
of 50 Years: and being quite worn out
with Old age and Labour: He left this
mortal State in the lively Hopes of a
blessed Immortality
Reader, reflect how soon you'll quit this Stage
You'll find but few attain to such an Age
Life's full of Pain: Lo: here's a Place of Rest.
Prepare to meet your GOD, then you are blest
Here lies also the Body of Elizabeth Wife to
the said William Bradford: who departed
this Life June 8 1731 aged 63 years

BRADFORD'S TOMBSTONE.

Braie du Grand Tympan, la (Fr.).—The skin of the tympan.

Braies (Fr.).—Spoiled sheets.

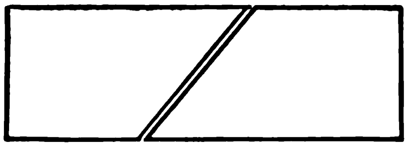
Brainard, Leverett, president of the Case, Lockwood & Brainard Company, of Hartford, Conn., was born at Westchester, in the town of Colchester, Conn., on February 13, 1828, and received a substantial common-school education there. When he was thirteen years of age his father died, and until his majority he stayed upon the farm then left to his mother. He went to Hartford in 1853, becoming secretary of the City Fire Insurance Company. He remained with it until he entered as a partner the firm of Case, Lockwood & Brainard, and not long after became its active manager, first as secretary and treasurer, and later as president, an act of incorporation having been procured as the Case, Lockwood & Brainard Company. It has a very extensive business both in printing and binding, and occupies large and commodious buildings, partly erected for it. Mr. Brainard is concerned in a number of other business enterprises centring in Hartford, and is chairman of the Committee on Manufactures of the Columbus Exposition to be held in Chicago in 1893, being a commissioner from the State of Connecticut.

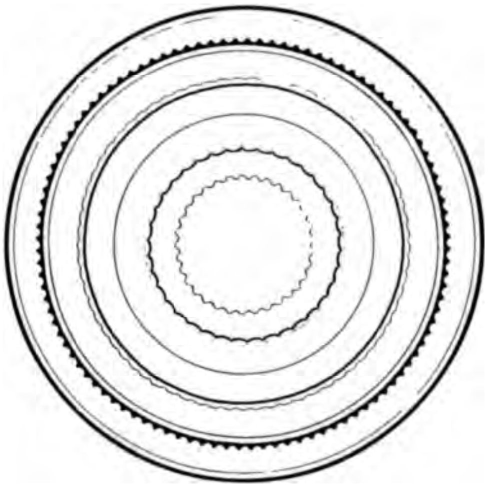
LEVERETT BRAINARD.

Branching Out.—Opening or extending the matter in title-pages, heads of pages or other parts, and also in jobs, with quadrats, leads, reglet or other proper materials.—*Savage.* This phrase is not heard in America.

Brass.—An alloy of zinc and copper, much used in printing. Two parts of zinc to one of copper is the usual proportion. An alloy of seventy parts of zinc and thirty of copper has a specific gravity of 8.4. Its general properties are that it has a fine color, is susceptible of receiving a high polish, and is only superficially acted upon by the air. It is very malleable and ductile when cold, but becomes brittle when heated. Its most extensive use in printing is for galleys, either wholly or in part, and for brass rules and leads, but it is also used to some extent for other purposes. Long pieces of type metal are brittle and stand little wear, and in their stead are employed corresponding pieces of brass. The metal is very tough, as well as hard. Bookbinders use it for type and for stamps.

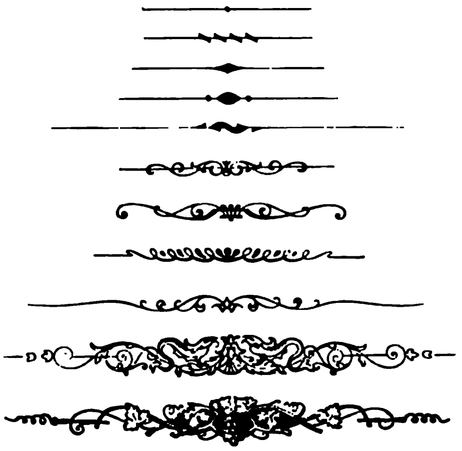
Brass Circles.—Rules in circular form, in which labels and some other jobs are set. Many faces can be procured and many sizes. When the reading goes across from side to side it is set with great care and justified in as well as possible, and after proof has been taken and corrected pieces of lead, paper and Dutchmen are put in. The latter are little plugs of wood. It is no discredit to use them, as it is in table-work or in ordinary jobs, for the most accurate compositor cannot justify these lines thoroughly. The galley should be flat. If there is a lead to be introduced inside, going around the inside of the whole of it, it should be of flexible material and the ends should be so cut that one part joins on the other, as shown in example.





Ovals, squares and geometrical figures are also made in the same way. A number of circles are given.

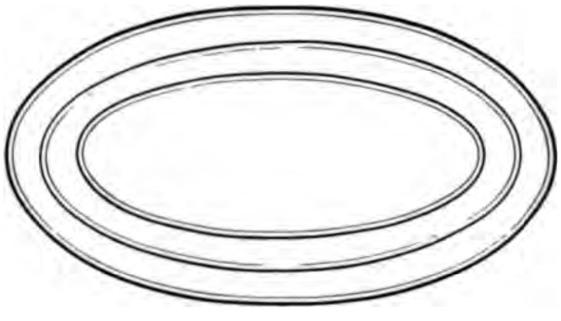
Brass Dashes.—Ornamental lines, used to separate one part of printed matter from another. In their simplest form they are really nothing more than a straight line made on a brass body, but a great variety is made, a few of which are shown.



Brass-Faced.—Electrotypes are brass-faced in order to prevent the discoloration and disintegration which would follow the use of red ink in printing if the copper were unprotected.

Brass Leads.—Space lines used to separate lines of type from each other, made of brass. See under LEADS.

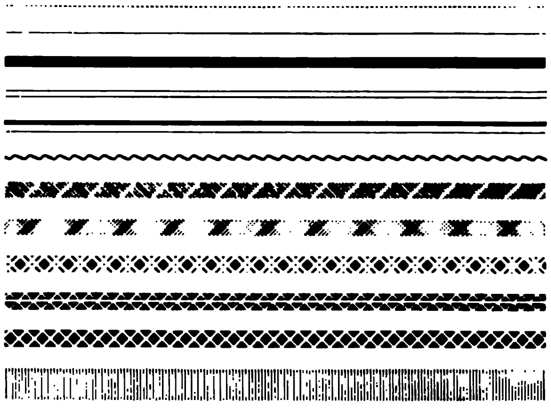
Brass Ovals.—Ovals made of brass of any desired curve or size. A few are here shown:



Brass-Rule Cases.—See LABOR-SAVING RULE.

Brass-Rule Cutter.—An apparatus for cutting up brass rule with greater readiness and accuracy than with the shears. See RULE CUTTER.

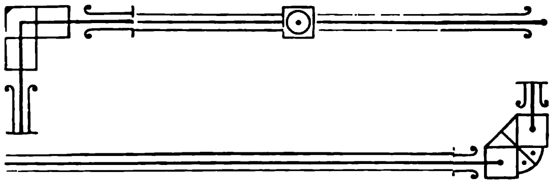
Brass Rules.—These are pieces of brass, usually between the hundredth of an inch and an eighth of an inch in thickness, and made type high. They are cut out of sheets of brass, which are rarely more than two feet in length, and this is the usual length of brass rules before being cut, although they can be procured longer. They are used for many purposes in printing where type metal would crumble and break, as they are both harder and tougher. The body may be of any thickness desired, eight to pica being the most common, and the thickness of the face may cover the whole top of the rule, or it may be a mere line. The usual faces are the light, the heavy, the parallel light, the light and heavy, the dotted and the wave, but there are also many ornamental rules. Specimens of these faces are here shown:



Brass rule forms a very valuable portion of an office for the purpose of an edging or border to pages. It can be used either with or without type, and the resources of an office are much increased by a liberal supply of this material. The letters of the alphabet were formerly used for this purpose, a line being above and below, as shown under BORDER.

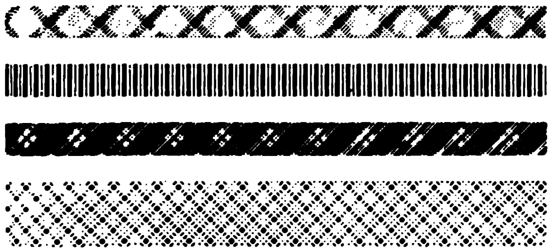
A line of small pieces of border is much strengthened by a rule on either side, which is frequently of a different kind. The example below is of a light rule at the top, flowers following, and a wave rule below:

Rule is often used for a part of a border, the remainder being the cast type-metal pieces, occurring most generally at the corners, as below:



The mitring or joining at an angle of two pieces is a nice piece of work. The tools and methods of doing this will be described under Rule Cutting, and it is only necessary to say here that the pieces of brass must join accurately. If done with shears, it is better to cut them a little long and trim them afterwards with a file. In estimating on the size allowance should be made for the probable magnitude when locked up. The page is then smaller, and if the rules join before being locked up the page will not lift. Rule must touch rule in tables. In ordinary table-work the up and down lines are brass rules; the transverse lines two and three em metal dashes. For ordinary work labor-saving rule may be used, or rule that has before been cut to determinate sizes and is then joined, but in fine work the rule should be in the longest pieces possible, as the labor-saving rule, after a little wear, shows the joining. When the rule is cut in the office the long pieces which come from the foundry should invariably be used, if new sizes are required; otherwise a good assortment will never be on hand. If octavo rules are cut down for 12mo, the next time an octavo book comes in there will be no rules. Cutting will go on continually, yet there will never be a supply. By the other plan it will not be long before there will be enough for nearly every emergency. Bent and twisted rule cannot be straightened so as to be used in first-rate work. Curves and circles of many faces can be bought from the foundries, as well as mitres. Column rules for a newspaper should always be of one piece, as otherwise the type might catch against one of the joinings and the lock-up be imperfect.

Very thin and very thick rules are made for special purposes, the former for ornamental work, where it is desired to bend easily, or to have a number of lines come together in a picture, and the heavy ones in some peculiar positions, the largest being about a great primer in thickness. Purely ornamental borders are also made with brass rule:

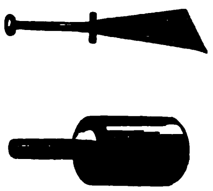


See further respecting this under Brass Dashes, Map Diagrams, Rule Curving and Rule Cutting.

Brass Type.—Type made of brass and used in bookbinding, where frequently heat has to be applied, which leaden types cannot endure. Brass types are also more durable.

Bray.—This is to distribute ink on the table by means of the brayer, preparatory to taking it on the roller.

Brayer.—A wooden pestle, cylindrical in shape, but flat upon the bottom, used with the hand-presses of the last century and the beginning of this. Later it became a small hand-roller. Its use was roughly to distribute the ink when first taken up, and lay it down in small quantities suitable for balls or rollers. It was with the wooden hand-press about seven inches long and two and a half in diameter at the bottom, the upper part being cut away sufficiently to make a good handle.



BRAYER AND SLICE OF 1805.

Brayer Ink-Table.—A table used by pressmen on which to bray out ink, distinct from cylindrical ink-tables.

Brasil.—A considerable amount of printing is done in the larger towns of Brazil, particularly in Rio de Janeiro. There are there about four hundred and fifty printing-offices, while in the whole of Brazil there are about a thousand. Rio has thirteen dailies, some of them with web presses, and fifty or sixty other periodicals, two of them being illustrated papers. The largest book and job office employs sixteen cylinders. There are many booksellers, who keep large stocks on hand, and there are also many stationers, but no type-founder or press manufacturer. There are no paper-mills turning out paper intended for newspapers or books, but there are some wrapping-paper mills. The ink is all imported. The other places of importance in Brazil as regards printing are Para, Pernambuco, Santos and São Paulo.

Bread-and-Butter Time.—In offices in England lunch time is frequently thus called. This is about 11 o'clock in the morning.

Break.—1. An expression used to indicate the end or beginning of a paragraph. It is indicated in copy by a paragraph mark, as ¶, or a bracket, [, the latter being the oldest, but not the most common way. 2. To pi or squash type.—*Jacobi*. These expressions, "squash" and "break," are not known in the trade in America.

Break-Line.—The last line of a paragraph, where quadrats are required to fill out the space beyond the words. In bookwork three, four or five letters ought never to make a break-line.

Break of a Letter.—The surplus metal on the foot of a letter when it is first cast.

Break Up.—An amateurish expression in England for distributing or clearing away.

Break up into Pars.—To break up solid copy into short paragraphs. (English.)

Breaker.—The boy or girl who breaks off the jet of metal which adheres to the type after it is cast.

Breitkopf, Johann Gottlieb Immanuel, an eminent Leipsic printer, was bred to the trade by his father, who was a printer in that town. An accidental perusal of a work by Albert Dürer, in which the shape of the letters is deduced from mathematical principles, suggested to him some important improvements in the art of casting letters, which gave his printing-office and foundry great reputation. He discovered a process of casting music type which made them much more widely used, although he was not, as has been stated, their originator. They had been known for many years. He invented a process for making maps out of type, which, although curious, has not proved useful. In 1793 he succeeded in printing Chinese characters with movable type, his specimens being much admired. He is also said to have discovered some improvements in the composition of type metal and the process of melting and casting. He was the author of several works upon typography and of one upon bibliography. He was born in Leipsic on November 23, 1719, and died there on January 28, 1794. The house is continued to the present day under the title of Breitkopf & Härtel, and is still one of the most complete in the world. Every branch of the art is there carried on.

Bremner Machine.—A single small cylinder press made by Harrild & Co., London. The feed-board is nearly on a level with the bottom of the cylinder. Grippers catch the sheet and carry it completely around, and then it is taken by tapes and deposited on a fly, from which it is laid upon the delivery-table. There is a two-feeder machine of this kind also, and they have been made with four and six feeders. There is one cylinder which in its continual revolution successively takes the sheets presented to it from as many points as there are feeding-boards. In the two-color machines there are one feeding-board, two forms and two sets of inking apparatus. The sheet is held fast to the cylinder by the grippers in the same position it was originally taken on, receiving the impression of first one form in one color and then the second in another color.

Brenton, James J., the editor of a newspaper in Jamaica, Long Island, was born at Pittstown, N. Y., in 1806. He commenced as a printer in Newport, R. I., in May, 1817, and in 1829 began the Washington County Advocate in Wickford in that State. In May, 1835, he established the Long Island Democrat at Jamaica, and carried it on until his death. In 1850 Brenton published Voices from the Press: A Collection of Sketches, Essays and Poems, by Practical Printers. This contains much good verse and prose, and is accompanied with biographical sketches of many printers.

Brevier.—A kind of type much used in all printing-offices, in size between minion and bourgeois, and by the point system known as eight point. Nine lines make an inch. It is half the body of a type very rarely cast, known as Columbian. In daily newspapers of the largest size it is generally used for editorial matter, and it is often the body of voluminous works where compression is necessary. No type is more valuable in a job office. It is called petit texte in French; Petit or Jungfer in German; brevier in Dutch, and testino in Italian. This Dictionary is set in brevier.

Brevier Brass Rule.—Brass rules cast on a brevier body.

Brewster, Charles Warren, author of Fifty Years in a Printing-Office and Rambles about Portsmouth, was born in that city in New Hampshire on September 13, 1812. He was apprenticed to the Portsmouth Journal, and fifteen years after, having passed through the intermediate stage of journeyman, he became its editor. At the time of his death he had been connected with the newspaper for more than fifty years. He was several times a member of the State Legislature, and in 1850 a member of the Constitutional Convention. He died on August 3, 1878.

Brewster, Osmyn, a publisher of Boston, died in that city on July 15, 1889. He was born in Worthington, Mass., on August 2, 1797, and was, therefore, ninety-two years of age. He was apprenticed to the printer's trade with Samuel T. Armstrong in 1812, and on November 1, 1818, he entered into partnership with his employer, his fellow-apprentice, Uriel Crocker, also being admitted. In 1825 Mr. Armstrong withdrew, and the business was continued by the young men as Crocker & Brewster. Mr. Brewster attended chiefly to the bookstore, while Mr. Crocker directed the printing-office. In 1876 they gave up business, having then been in partnership together fifty-eight years and associated as printers for sixty-four years. Their copyrights were disposed of to Henry O. Houghton & Co. Their house was probably the only bookselling or publishing firm in Boston that did not fail either in the crisis of 1837 or the panic of 1857. Mr. Brewster was several times a member of the Massachusetts House of Representatives, and was also in the State Senate and a member of the Constitutional Convention. In November, 1886, he and Mr. Crocker celebrated the seventy-fifth anniversary of their connection in business.

Brian, Henry T., foreman of printing at the Government Printing-Office, Washington, D. C., was born in Baltimore, Md., on September 13, 1843. He received a liberal education in the public schools and high school of Baltimore, and served an apprenticeship at the printing business with W. M. Inness, then proprietor of the largest book and job office in the State. At the beginning of the Civil War he enlisted in the Union army as a member of the Ninth Maryland Infantry, and in the third year was taken a prisoner of war, being confined at Belle Isle from October, 1863, to March, 1864. On September 13, 1867, he began work at the case in the Government Printing-Office, and was promoted step by step until in March, 1870, he received the appointment of assistant foreman of printing, and in 1871 foreman of printing, under A. M. Clapp, the Public Printer, and held the position until 1877, when he was removed by J. D. Defrees. He was reappointed to the same position in April, 1882, by Sterling P. Rounds, when the latter took charge, and has served continuously in that position ever since, or during the administrations of S. P. Rounds, T. E. Benedict and the present incumbent, F. W. Palmer. His appointments and promotions have been given him entirely without political influence. During his occupancy of this position he has probably had charge of the printing of more books with large editions than any other foreman in the printing business. He has also had under his charge more printers than any other foreman. He was a member of the jury of award of the class of printing, stationery, &c., at the Centennial Exposition in Philadelphia in 1876.

HENRY T. BRIAN.

Brilliant.—1. An exceedingly small size of printing type, being in body half minion. It is a curiosity only, although some small books have been composed in it. In the point system it is three and a half points. 2. The proposed name for a size of type of which the body should equal three points, or half a nonpareil. This title ought not to be used, as it has for some time been appropriated to half minion.

This line is set in Brilliant.

Bring Up.—To bring up a form is to place overlays on those parts in which the impression is defective, and to cut away those portions in which it is too heavy, so as to equalize the impression over the whole form. See Making Ready.

Bristol Boards.—A class of very fine pasteboards, originally chiefly used for drawing, but now employed largely for printing purposes. They may be of different thicknesses, as three ply, four ply.

British Museum.—The great English library, which not only contains more books but renders them more accessible than any other in the Old World. It was founded in 1753 by an act of Parliament, in consequence of a bequest by Sir Hans Sloane, who left his museum, which had cost him upwards of £50,000, to the nation, on condition that his executors were paid £20,000 and that a house sufficiently commodious be purchased for it. Other donations were made, and £85,000 were raised by means of a lottery. George II. and George III. gave large collections of most valuable books, and George IV. did likewise. Magnificent purchases have been made of special collections, not only of books, but of objects of art and science, and every year a large sum is appropriated for its enlargement. The printing of the catalogue of this immense collection began in 1881, and about a third of it, or 950,000 titles, was completed in 1888. This third comprised from A to G, and from the middle of V to the end of the alphabet.

Broad.—1. This term is frequently applied in England and sometimes here to forms in which the pages are wider than usual, resulting from a different fold or different paper. It is used together with the fold, as broad thirds, broad sixes or broad twelves. 2. A stick set wider than it should be is broad. 3. A piece of furniture, wood or metal four picas in width. Not used in America, our expression being four-line furniture.

Broad and Narrow.—Furniture seven picas in width—a broad and narrow combined. This expression is not used in America.

Broad Quotations.—Metal quotations which are four ems pica square. Unused in America.

Broad-Thirds Card.—In England, a large card cut into three the long way.

Broadside.—A sheet printed on one side only, such as a poster or handbill. This expression is used in England, but never among printers in America. On this side it is a bibliographer's term only.

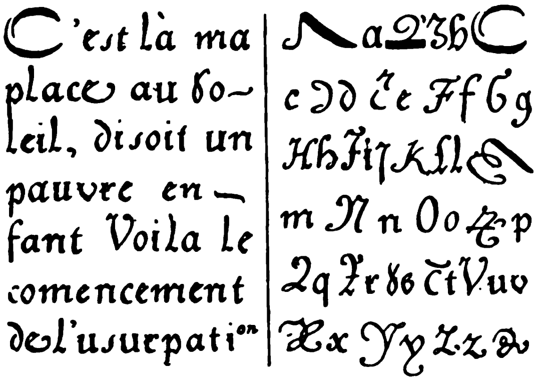
Broadside Chases.—In England, chases of a large size, without crossbars, used for posters.

Broadside Sticks.—Wooden sticks, used for the purpose of setting posters. Thus called in England.

Brochure (Ital. and Fr.).—A pamphlet or a few sheets sewn together.

Brodschriften (Ger.).—The type used in printing the body or main part of a book. Brodschriften is a term originating in the early days of printing, meaning those kinds of type indispensably necessary to enable the printer to do his work and to earn his bread; body type.

Broken Bastard (Batarde brisée).—The name of a kind of type cut by Pierre Moreau in 1640. It is slightly diminished in the reproduction shown here, the original being double English. The separate characters can be distinguished by noting the fact that the lines begin respectively with A, c, H, m, Q and X. There are an I, i and j, one k, V, u and v, and an &.


C'est là ma place au so-leil, disoit un pauvre en-fant Voila le comencement de l'usurpati^on

PIERRE MOREAU'S BROKEN BASTARD.

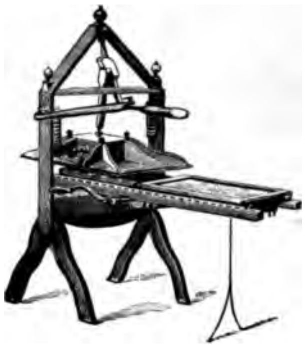
Broken Letter.—A term formerly used for pi.

Broken Matter.—Pi.

Broken Neck.—A ball is said to be broken necked when the wood in the bowl of the ball-stock separates from the body of wood in the ball, so that when the ball is held in a horizontal position by the handle it hangs down in a flabby manner.—*Savage.*

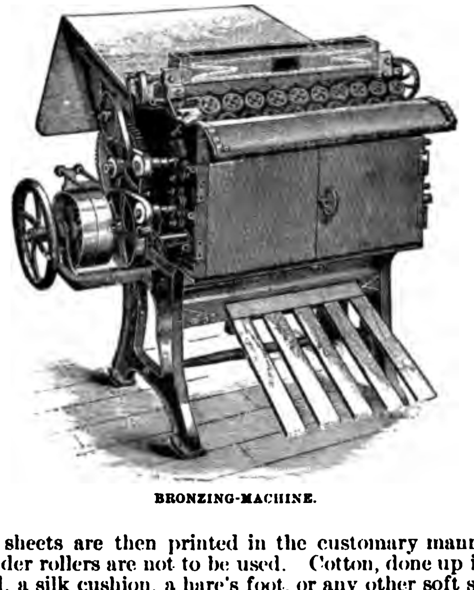
Broken Over.—When plates are turned over or folded a short distance from the back edge, before they are placed in the volume, so as to facilitate their being turned easily or laid flat, they are said to be broken over. When a leaf has been turned down the paper is broken.—*Zaehnsdorf*

Bronstrup Press.—A hand-press formerly made by Frederick Bronstrup of Philadelphia, the successor of Adam Ramage, and having three sizes. The largest is 22¾ by 29½ inches, the next 20 by 26 inches, and the smallest 16 by 22 inches. The material is chiefly wrought-iron, and the press stands securely without a stay.



BRONSTRUP PRESS.

Bronze.—A metallic dust thrown upon a glutinous varnish or ink, and thus giving a lustre to it. It is most commonly of gold, but silver and a dozen other colors have been made. The form is made ready in the usual way and placed upon the press. The fountains are filled with varnish or the substance which is mixed with coloring matter to make ink, but stiffer than usual, and the sheets are then printed in the customary manner. Tender rollers are not to be used. Cotton, done up in a wad, a silk cushion, a hare's foot, or any other soft substance, can be employed. It is dipped into the powder and then put squarely on the printed matter. After covering the impression the ball may be rubbed along, as if polishing. This materially improves the lustre of the result. Much more bronze is, of course, used than



BRONZING-MACHINE.

is retained by the sheet. This is wiped off, and it is well to do the bronzing in a zinc or tin tray, that the superfluous dust thus taken off may not be lost. The bronze powder is highly injurious to the person who works in it, as it is inhaled and induces metallic poisoning if long kept up; it is well, therefore, to wear a respirator or to have a glass in front of the face, the hands passing around it. Clean balls of cotton or other material should be used from time to time, as they improve the appearance of the work. It increases the brilliancy of the job very much to have it pressed or burnished. After it has been dried it is passed through iron rollers, like those in a washing-machine, but without india-rubber facings. Bronzing-machines have been introduced of late years which have proved very successful. They give a greater lustre than can be obtained by hand, while sharper and clearer, and in large letters, like six-line pica Gothic, with an evenness and smoothness hitherto unknown.

BRONZING-PAD.

Bronze Ink.—Various inks made with an addition of bronze. When dry they give a decided metallic appearance to the surface.

Bronze Preparation.—A varnish used for printing preparatory to dusting the bronze on the impressed letters.

Bronze Printing.—The art of printing in bronze.

Bronzing-Machine.—A mechanical contrivance to economize time and obviate waste of material in the use of bronze.

Brooke Press.—A modification of the ordinary wooden hand-press at the beginning of the century so as to adapt it to do larger work and work requiring more pressure, the ideas applied being those derived from the improvements of Lord Stanhope. The platen has more iron to it, so that it may not yield, and there is a counterbalance, which lifts it up as soon as the force is withdrawn. The main difference is in the mechanism for moving the screw, which is substantially that of the Stanhope, and is all of iron. There is no till or shelf, it being done away with, and the platen being guided in its movements by projections which fit into grooves in the cheeks. The bed, frisket, tympan, winter and rails are substantially like those of other wooden presses. These machines were employed for a time in England, as were others which were modifications of the old-style press, but it is doubtful if they were ever brought into use in this country. The increased power was too much for the wooden part of the press, and constant repairs became necessary. In the end these mixed wooden and iron presses were abandoned for iron ones. This change took place in the United States by the year 1830, very few wooden presses being at work after 1835, but in Great Britain and Ireland they were employed for a dozen years longer.

Brooklyn, a large city of the State of New York, has five or six dailies, twenty or thirty other periodicals, one printing-office and bookmaking establishment of the largest size, that of D. Appleton & Co., and some forty other printing-offices. It does less printing and less publishing in proportion to its size than any other large city of the Union, as it is completely overshadowed by New York, of which it is practically a suburb. The first newspaper was by Thomas Kirk, who had a short time before come over from England. It was entitled the Courier and New York and Long Island Advertiser, and was begun in 1799. The first daily was in 1841.

Broschüre (Ger.).—A pamphlet.

Brosse, la (Fr.).—The brush used in making papier-maché matrices, or in taking proofs by the brush.

Brothers of the Common Life.—A religious community which, immediately after the discovery of printing, began the use of the art, as they had before applied themselves to copying. They printed books in 1476 at Vallis Sanctæ Mariæ, a convent in the Rheingau, a territory belonging to Mentz, and also at Brussels from 1476 to 1484, and probably at other places. The founder of the brotherhood, which in Latin was Fratres Vitæ Communis, was Albert Gerard, commonly called the Great. He was born in 1340 and died in 1384. He led a dissolute life for some time, but becoming reformed devoted himself afterwards to reclaiming men of evil lives, and was so successful in his labors that he instituted this society. Their support was gained by transcribing the Scriptures and other holy books. Successive popes confirmed and extended their privileges, and in 1462 the order possessed seven monasteries. The monks who were devoted to writing were classed as librarii, that is, the transcribers of old and new books; antiquarii, the copyists of old books; tachygraphi, shorthand or rapid writers, and calligraphi or elegant writers.

Brough, H. Bruce, a printer of Toronto, Ontario, was born near Peterborough, in that province, in the year 1859. At the age of fourteen he left school to enter the Times office at Peterborough. After spending a year there he went to the office of the Belleville Intelligencer, and then was four years as an improver with Dudley & Burns, in Toronto, afterwards becoming their foreman. At twenty-two years of age he was promoted to the office charge of the Montreal Printing Company of Montreal. He was two years in Boston, and then took up his abode in Toronto, where he began business for himself in 1886. Shortly after he formed a partnership with N. F. Caswell, under the firm-name of Brough & Caswell, their business now being extensive and of a good class. He is the secretary of the Toronto Typothetæ, and has twice been a delegate to the conventions of the United Typothetæ.

Brown's Typesetting Machine.—This machine does not seem to have ever gone into use further than to have experiments made with it by the inventor, but its main idea is so different from others that it is worth while giving a description of it. The types are arranged in long channels, as is common, but in front of the bottom of these lines and a little lower down is a movable stick, holding one line, which runs sidewise in a groove. It is placed opposite to a letter, a key is struck and the type falls in, and as the stick is moved one way or the other the letter is pushed down solidly against the letters already composed. When the stick is full it is run to one side of the track, the line then being slipped into the justifier. The stick is then ready for another line; and when several are set they are taken up and justified by hand. The inventor of this was O. S. Brown of Boston, who in 1870 announced his intention to supply typesetters adapted to long primer or larger sizes of type, with a case of sixty letters, for $300, or a greater number of letters at a proportionate rate. A speed of 1,800 ems an hour was claimed, and it was also believed that unskilled compositors could do far better with it than they could by hand. There was also a distributor attached to this, which depended upon peculiar nicks in the type, as do all other mechanical devices which have been used for distributing.

Browns.—A term used in England to describe the make of paper known as brown paper.

Broyer l'Encre (Fr.).—To bray out the ink; to do the first rough distributing of the ink with the brayer.

Bruce, David, the type-founder, was born in the town of Wick, County of Caithness, Scotland, on November 12, 1770. His father was a farmer who had been unfortunate in business and removed to Edinburgh with a large family. David went to sea when a boy and was impressed into the Channel fleet under Lord Howe. At nineteen he returned to Edinburgh, where, in the king's printing-office, he learned the trade of printing. Immediately after completing his term he emigrated to America, landing in New York in the year 1793. In 1794 he was employed by Hall & Sellers of Philadelphia, the successors to Franklin. A few years after he returned to New York, and in 1806, in conjunction with his brother George, established the firm of D. & G. Bruce, printers. They rapidly increased their business, and in 1812 David Bruce determined to acquire a knowledge of the art of stereotyping, which had then been known some ten years in Great Britain, and took passage for England. He could get no competent person to instruct him, but by close observation and the expenditure of considerable money thought he had the essential portion, and returned. In the actual making of plates here he was preceded by John Watts, but the latter relinquished business in 1815 or 1816, and never did much work. Bruce introduced a number of improvements, and stereotyping soon became more common and better done here than in Great Britain. In 1813 he and his brother also began type-founding, which increased so much that they finally abandoned both printing and stereotyping, making letter-casting their sole business. In 1822 they dissolved partnership, David Bruce retiring to a farm, but returning for a brief period to New York several years after as a type-founder. After this was concluded he spent the remainder of his days upon his farm, but died in Brooklyn on March 15, 1857, aged eighty-seven, while on a visit to his son, David Bruce, Jr.

Bruce, David, Jr., the inventor of the type-casting machine, was born in New York city on February 6, 1802. He is the son of David Bruce, the type-founder and introducer of stereotyping in this country. He was employed in various capacities as a boy about the type-foundry and printing-office of D. & G. Bruce, but was apprenticed in 1819 to William Fry of Philadelphia, at that time the most eminent printer in America. From him he ran away, returning to his father, and with the latter thoroughly learned the type-founder's trade, becoming a letter-cutter, matrix-fitter and caster. About 1828 he removed to Albany, to take charge of a type-foundry there, but returned to New York in 1830, and became a member of the firm of George Bruce & Co. In 1834 he retired to New Jersey, determined to construct a more perfect machine for casting types than had before been known. In this he was successful, and produced the machine now in use over the whole globe. He began business again in New York, but only continued it for a short time. He is still living in 1891, at eighty-nine years of age, being the oldest printer of Philadelphia or type-founder of New York now living.

Bruce, George, a type-founder of New York, was a native of Edinburgh, Scotland, where he was born on June 26, 1781. As it was feared he would be impressed into the army or navy, his family sent him to America, where an elder brother, David, had already gone. He arrived in Philadelphia in 1795, and began learning the trade of a bookbinder, but disliked his master, on account of the hardships put upon him, and determined to run away. His brother induced him to reconsider his purpose, and he entered the office of Thomas Dobson as a printer's apprentice. That was burned down in 1798, and as yellow fever was prevalent the brothers left Philadelphia, reaching New York a little later. George worked as a journeyman from that time till 1806, when he and his brother received an offer to print Lavoiser's Chemistry. They borrowed the type and press, and began business at the corner of Coffee House slip and Pearl street. Their venture proving successful, they were soon able to purchase their own type and to enlarge their business materially, so that in 1809, when they were in Sloat lane, they had the largest office in the city, with nine hand-presses. The attempt they made in 1813 and 1814 to begin stereotyping was resisted by the type-founders, who thought that the consumption of type would be much lessened if this art took a firm foothold, and they were compelled to cast for themselves. To this new business George Bruce devoted his attention, David looking after the stereotyping. An unsuccessful type-foundry was purchased, new punches were cut, both by Mr. Bruce and others, and in two or three years the business was in a prosperous way. In 1816 they sold out the printing department, and removed to Eldridge street, going in 1818 to Chambers street, where their foundry has been ever since. The first Bruce specimen book was issued in 1815. In 1822 David Bruce retired, and George Bruce relinquished stereotyping, there being then four or five competitors. In that year he devised a scheme for having an equal gradation in types, each size in descending containing a certain proportion more of ems in a given space than did the one just above it. In ascending, the seventh size above a given one doubled it in magnitude. To carry out this scheme fully he devised the type known as agate. He gave much support afterwards to type-casting machines, and at one time offered a premium for a new press suitable for country printers. Mr. Bruce was himself distinguished for his skill as a punch-cutter. His Romans and scripts have never been excelled. He continued his labors to some extent until he had attained a great age, dying July 5, 1866, at the age of eighty-five. He was succeeded by his son, David Wolfe Bruce, born in March, 1824, who associated with himself as a partner James Lindsay. The present Mr. Bruce has an unequaled library of books upon typography.

GEORGE BRUCE.

Bruchziffer (Ger.).—Fractions.

Brush Out.—In England, to clean out a form by means of lye or turpentine.

Brussels.—A city of Belgium which has been for many years a centre for printing in English, French and German. Copyrights which were good in the neighboring countries were not good here, and several large firms have amassed fortunes in reprinting and publishing popular works. Flemish, the native tongue of most of Belgium, has in it very little printing.

Bryden, William, an early maker of presses in Philadelphia, believed to have been the first regular manufacturer of this kind in the United States, died in New York while on a visit in the year 1811, being then about fifty years of age.

Buch, ein (Ger.).—A book ; also, a quire.

Buchbinder (Ger.).—Bookbinder.

Buchbinderkunst (Ger.).—The art of bookbinding.

Buchdrucker, der (Ger.).—The printer ; die Buchdruckerei, the printing-office ; die Buchdruckerkunst, the art of printing.

Buchhändler (Ger.).—A bookseller.

Buchhandlung (Ger.).—A book-store.

Buchstaben (Ger.).—Letters of the alphabet.

Buchstaben, Falsche (Ger.).—Wrong letters.

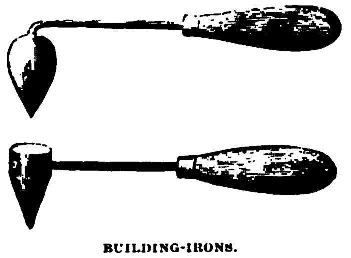
Buckle.—In electrotyping, when the shell has folds or hills in it, making an irregular face.

Buell, Abel, an early American type-founder, was a native of Killingworth, Conn. He was taught the silversmith's art. In 1766 he petitioned the General Assembly to restore to him his former rights and privileges, of which he had been deprived in consequence of forging a colonial note while an apprentice. The petition was granted. In October, 1769, he sets forth to the Assembly his discoveries in type-founding, on which he had spent months, and asks for assistance to erect a proper foundry. This memorial was printed upon types of his own manufacture. The Assembly granted his request, and ordered that £100 should be lent him on bond for seven years, and that after a twelvemonth another £100 should be lent him. Aletta Buell, his wife, returned £100 in 1777, her husband then being absent. After the Revolution he made a map of North America, and in executing it made a survey of the coast about Pensacola. He was afterwards employed by the State in coining, for which he made all his own apparatus. He visited England subsequently, where he acquired some knowledge of the manufacture of cloth, and on his return erected a cotton manufactory at New Haven, one of the first in the United States. He died in 1825, being then upwards of seventy-five years of age.

Buenos Ayres.—This city, which now has a population of about half a million, supports 180 periodicals, forty-four being daily. One hundred and fifty-two of these are in Spanish, and carried on by Argentines, and the remainder in foreign languages. Nine are in Italian, seven in English, four in Spanish, three in German, and several in other languages. There are besides four which represent Spanish interests. In the Argentine Republic there are 452 newspapers in all. There are between eighty and ninety printing-offices in the city, the general wages being $65 a month. This is paid in depreciated currency, and is in reality worth but half this. Stiller & Laas have the largest printing-office there, and it is believed in South America. They employ three hundred hands.

Buffalo.—A city of Western New York which has grown up entirely within the present century. The first newspaper was the Buffalo Gazette, published by S. H. & H. A. Salisbury. By 1840 printing had attained large proportions there, and by 1850 the colored work of Buffalo had only one competitor in the United States. At present there are ten dailies and forty other periodicals published in the city, and there are four or five printing-offices of the greatest magnitude, as well as nearly seventy-five smaller ones. There are one or two type-foundries and many bookstores.

Building Up.—In electrotyping, after an impression of the page has been taken in the wax, to put more wax on the places where blanks will show in printing, thus insuring that the paper will not touch the plate in that particular place. Building-irons are used to touch and melt the wax where it is needful.



BUILDING-IRONS.

Bulgarian.—A dialect of the Slavonian languages which belongs to their eastern group. The type used is Russian. Books in this tongue occasionally appear at Bucharest, Belgrade, Constantinople and Odessa.

Bulk.—A flat table fastened to some of the frames in a book office, about three feet from the floor. Pages of type are put upon it.

Bullet.—When a workman at press or case, either for neglect, want of punctuality, or for gross misconduct, is discharged instanter and the usual notice of a fortnight is not given it is said "he has got the bullet." —*Savage.*

Bullock, William, an inventor who obtained celebrity by his improvements in printing-presses, was born at Greenville, Greene County, N. Y., in 1813. He learned the trade of iron-founder and machinist, gaining a good knowledge of mechanics. He began the publication of a newspaper, the Banner of the Union, in Philadelphia in 1849, which was afterwards removed to Catskill, N. Y. There he made for his personal use a wooden press, turned by a crank, to which a self-feeder was attached. He then went to New York city, where he constructed a large fast press for Frank Leslie, which enabled him to issue a special edition which contained an account of the Heenan and Sayers fight. Later he constructed the press which is known by his name, and had just attained success when, in working about the machine, he was caught by it and so severely injured that he died nine days afterwards, on April 12, 1867. By his apparatus he revolutionized the methods of all swift newspaper presses. Instead of depending upon a large cylinder, bearing upon a portion of its circumference the forms to be printed, he introduced a small cylinder, upon which were placed curved stereotype plates; the paper fed itself to the press, being in rolls, the roll rotating as it was needed, and when printed the sheet was cut off. The idea of a roll was not new, having been thought of by Rowland Hill in 1836, and by Jephtha A. Wilkinson six or seven years later, but mechanism to feed it was not put into operation by them. Similar presses were soon in use in England, the first being the Walter press, and shortly after Hoe introduced the same design here. The mammoth presses once necessary are no longer useful.

Bullock Press.—A web press, the earliest of that kind made in this country. Several sizes and varieties are made. They are very compact, strong and easy running, and are made either with or without folding attachments.

Bullock's Heart.—A pressman's expression for working 250 copies—a lean number.—*Jacobi.*

Bulmer, William, a native of Newcastle-upon-Tyne, rose to high distinction as a printer, and was the subject of many encomiums from Dibdin in his bibliographical works. He was born in 1756, and entered the printing trade in his native town with Mr. Thompson. While yet an apprentice he formed an acquaintance with Thomas Bewick, then also a boy, but afterwards the celebrated wood-engraver, and every leisure hour they could spare was spent with each other. Bewick's proofs were always taken by Bulmer. Among those so done were the Huntsman and Old Hound, which obtained for Bewick, when he subsequently exhibited it in London, the premium of the Society of Arts. As it was impossible with the press and method of making ready then in use to obtain such results as are now known to every good workman, Bulmer suggested to his friend a plan of lowering the edges of the blocks slightly, thus giving them less pressure and preventing their harsh appearance. After completing his time Mr. Bulmer went to London, where he was employed by John Bell, a famous bookseller of the day. He was then publishing his miniature editions of the poets. About 1787 an accidental circumstance introduced him to George Nicol, who purposed a very ornamental edition of Shakespeare. Type had already been cut for it by William Martin, of Birmingham, who had been concerned with Baskerville. This type was to have the delicate hair-lines and sharp serifs of the French and Italian printers. He finally placed Mr. Bulmer in charge of the new printing-office, which he entitled the Shakespeare Press, the title of the firm being W. Bulmer & Co. His management showed that he had been fitly chosen. "This magnificent edition," said Dr. Dibdin, "which is worthy of the reputation of our unrivaled bard, will remain, as long as those compositions shall be admired, an honorable testimony of the taste and skill of the individuals who planned and conducted it to its completion." The first number of the Shakespeare appeared in January, 1794, and at once established the fame of the first practical printer of his day. A Milton in three volumes folio was likewise very fine. The Bibliographical Decameron of Dr. Dibdin was described by the critics of the day as the most eminently successful work for skill and beauty in the art of printing ever done. Never was such a variety of ornament, in the way of wood-cuts and red and black ink, exhibited. A multitude of other works also issued from his press, nearly all of them of a high grade of excellence. He retired from business in 1819 with a well-earned fortune, and was succeeded by William Nicol, the only son of his old friend. He died on September 9, 1830.

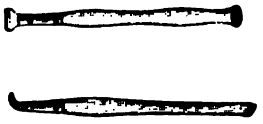
Bunch.—In the art of type-founding, the quantity of type which is taken at once by the rubber to rub on the stone—twenty or thirty letters.

Bundle.—Two reams of paper tied together. This was the method in which paper was always sent to the printer half a century or more ago, the outer quires forming the cover.

Buntdruck (Ger.).—Colored printing.

Buntdruckschriften (Ger.).—Letters intended for printing in two or more colors. One fits into or joins another letter.

Burnish.—The glossiness produced by rubbing the edges or leather of a book with a highly-polished substance.



AGATE BURNISHERS.

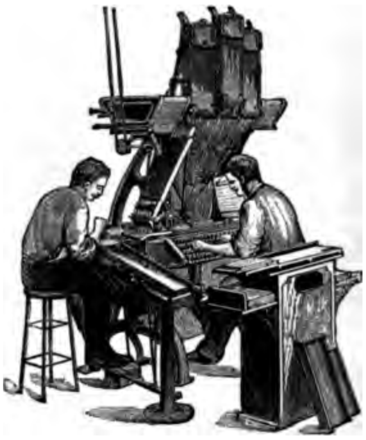
Burnished Edges.—When edges are colored and polished with a burnisher.

Burnishers.—Tools of metal or of polished stone used in binding to give a polish to the gold upon the covers and the edges of the leaves.

Burnt Documents.—No certain method is known to the bookbinder for restoring books and papers that have been charred in fires. Zaehnsdorf quotes approvingly from a scientific periodical an account of how some books were saved sufficiently to have their leaves opened and their pages transcribed. The volume was a register which was burned while the Commune held sway in Paris. It was one of many which looked like solid blocks of charcoal. When an attempt was made to take off a leaf it fell into powder. In restoring the book its back was cut off. The volume was then steeped in water, afterwards being exposed to the heat of a house furnace. The steam, in coming out, raised and loosened the leaves, so that they could be separated, but with extraordinary care. There was no difficulty in reading the writing, as although on a black surface it had a different kind of blackness.

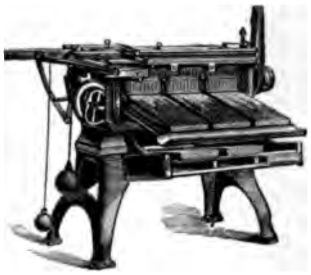
Burr.—The rough pieces of metal thrown up by the burin in engraving, which make a black, rough mark in printing unless rubbed out. By repeated impressions this is worn down, and together with it the other lines, so that a print in which a burr shows is more valuable than a later impression in which there is none. In letter-press printing, the projection or rough edge left in casting type, leads or slugs.

Burr Typesetting-Machine.—An apparatus for mechanical composition, invented about 1871, and continuously in use in New York ever since. It consists of two parts, a composing and a distributing machine, both considerably different from any preceding invention, and a device to assist justifying, used in connection with the former. The type is arranged in long lines, from which it is dislodged by a hammer or finger, then slipping down by run-ways to the bottom, all the grooves converging towards the centre. At the foot of the front plate is a pendulum gate, through which the type passes into a race or channel. A cam in the race drives ahead each letter and the line continuously, keeping a place continually open to receive a new type. The line is thus kept moving continually towards the justifier, who holds in his left hand an instrument called a grab adjusted to the required measure. He draws the needed length from the line into the composing-stick, which is simply two abutments upon a composing-rule, when he justifies the line. Convenient to his hand is a series of channels of spaces, and at the bottom of each channel are thumb-pieces so arranged that the pinching of them together leaves between the thumb and finger of the justifier one, two or three of the particular spaces he may desire. Adjacent to this space-furnishing mechanism is a galley containing the large quadrats, which are kept so arranged that the justifier readily takes with his grab such blanks or spaces as he needs. The usual galleys are employed, being quickly put on and taken off.



BURR COMPOSING-MACHINE.

Each type is nicked differently from the others, so that a c can be distinguished from an e by the nick alone, and a b from a p. These nicks are in addition to the usual foundry nick, and are on the back. They are of no value in typesetting, but are in distribution. When the type is placed on the galley for distribution one line is taken off at a time, and from this one letter at a time. At this point the letter is taken by a carrier, which moves it to a place where there are projections exactly corresponding to the indentations on the type. This slips into the place thus provided for it, the carrier is released from its labor, and returns for a new load. The disengaged type is added to a long line of the same letter, and is then ready to be transferred to the composing-machine.



BURR DISTRIBUTING-MACHINE.

These machines have now been in use in New York for many years, and frequently have accomplished 50,000 and even 55,000 ems a day. The rate of wages on them has been for the key-board operator (the compositor), 6½ cents a thousand; justifier, 6½ cents; distributor, 3 cents; correcting, 2½ cents; and incidentals are estimated at 1½ cents; total, 20 cents.

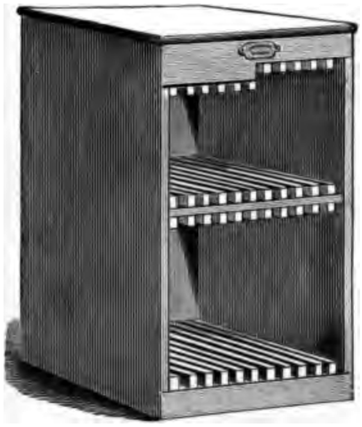
Button of the Tympan.—An iron button with a female screw, screwed on a square-shanked bolt that goes through the bottom frame of the outer tympan in wooden presses, and turns on the upper side of the inner tympan, to assist in keeping it tight in its place.—*Savage.*

C

C THE third letter of the alphabet, occurs with considerable frequency. In thickness it varies from two-fifths to three-sevenths of an em. The capital C resembles the capital G very much, and in the lower case when badly printed is often mistaken for an e. "In English," says Ben Jonson, "it might well have been spared, for it has no particular sound." The Romans frequently denoted kappa and sigma in Greek words by a c, and they also used this character in many words where at a later period g was substituted. Thus leciones was written for legiones. Q and C are often interchangeable on ancient monuments. Thus we find Q V M for C V M, cotidie for quotidie. C stands for one hundred in Roman numerals. On medals it represents many names of persons, as Cæsar, Caius and Cassius; of officers, as censor, consul; of cities, as Carthago; also for cives, civitas, colonia, cohors, castra, circensis. In music it is the key-note of the natural major mode.

POLHEMUS CABINET.

Cabinet.—A framework for containing cases, in which the latter fit so closely as to exclude dust. As usually made, the cases are shallower than common, the front piece has no ledge, the side pieces are made to project behind the back, so that when the receptacle is drawn out sufficiently to set from the last row of boxes there is still abundant support, and there are handles in front with which to pull out the cases as they may be needed. The invention is an American one, and has so far been very little introduced in Europe. There are many kinds. This term is also used in printing-offices for other close-fitting receptacles for ink, leads and miscellaneous sorts.


CABINET FOR CHASES.

Cabinet Cards.—Cards cut 4¼ by 6½ inches, used by photographers for mounting prints of that size.

Cable.—The electric wires which go from this country to Europe are commonly spoken of as cables, and dispatches are frequently said to be cabled.

Cadrats (Fr.).—Quadrats.

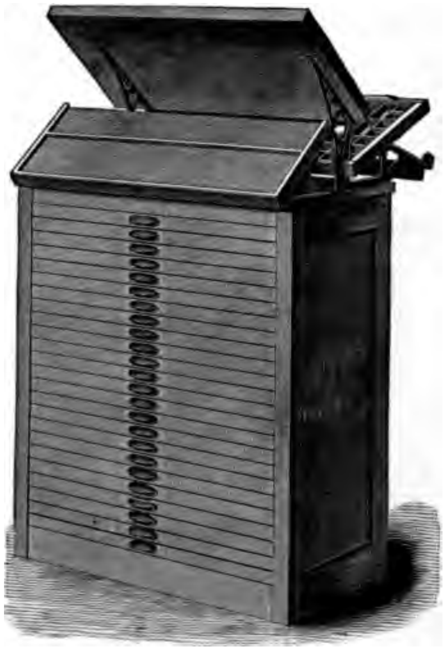
Cahier (Fr.).—Writing-book; note-book; blotter. In the stationery trade, a fourth of a quire.

Calami.—The reeds formerly used for pens.

Calandres (Fr.).—Hot-pressing machines.

Calculer (Fr.).—To calculate the amount of manuscript; to cast off.

Calendar.—An orderly arrangement of days, weeks and months, forming part of an almanac, or a separate sheet partly serving the purpose of an almanac. These are frequently very ornamental.


BOSTON DUPLEX CABINET.

Calendered.—Paper is said to be calendered when it has been passed through a calender. When the pressure has been frequently repeated the paper is said to be super-calendered.

Calendering.—Smoothing paper by means of rollers, through which the sheets are passed under great pressure. This not only makes the paper even, but gives it a gloss. The lowest grade of paper is not calendered, but most grades above are submitted to this process. See PAPER.

Calf.—This material is very extensively used in what is known as half-calf extra binding, and in connection with marbled edges and marbled paper sides. It is frequently employed for full bindings, and admits of great variety in the style of finish. It can be had in every color, but is not so durable as morocco, and should not be used on large or heavy books. For octavo sizes and under it is a suitable and popular binding.

Calf-Lined.—Limp-bound books; the inside of the limp cover is lined with calf-skin, taking the place of the half of the end paper which otherwise is pasted to the inside of the cover, thus allowing of the books being easily rolled up.

Calico Printing is the process by which cotton cloth, white or unbleached, is so marked or colored that it exhibits various patterns or figures. If all were of one uniform hue this might be obtained by a dye, but checker-work, flowers, arabesques or geometrical lines, or more elaborate figures, must be shown in different colors. It was unknown in England until 1696, when a small print-ground was formed upon the banks of the Thames, near Richmond, by a Frenchman. There are five different methods known for imparting the color. Before any one is tried, however, the cloth must be freed from fibrous down by singeing, and be rendered smooth by the calender. Small wooden blocks are held against the color and then laid upon the cloth, a smart stroke with a mallet being given. This process is a very slow one, as the block is very small and there are many colors to each piece. The Perrotine does the same thing mechanically, and twenty times as fast as an ordinary man. It is a system of revolving blocks, each forming the face of a prism. Copper-plate printing on calico is the same method as is used in printing from paper. The cylinder machine has the same principle as the modern web machine in printing newspapers. Calicoes are affected before any of these processes are attempted by peculiar chemical processes, chiefly by mordants. The cloth is steeped in a solution which enables the roll of cloth afterwards to take particular colors and not others. These colors are also stopped out by paste or other substances. The art is wholly unlike that of printing colors in typography.

California.—Printing began there at Monterey in 1846. After the gold fever commenced newspapers were started everywhere throughout the State where there were settlements, and separate book and job offices were soon after begun. There has been a remarkable development of the press in San Francisco, and Sacramento and other towns do a large business. When prices were at their highest compositors in San Francisco frequently made a hundred dollars a week in gold, but wages have now sunk to the level of all the rest of the country. By the last census the number of dailies in this State was fifty-eight; weeklies, 250, and all other periodicals fifty-three. A large number of books are published there.

California Job Case.—A case made on the capital side so that there are only five boxes, up and down, instead of seven, as commonly. The California two-third case is two-thirds of the length of the ordinary lower case, a rather greater proportion being given to the left-hand or lower-case side than to the right-hand or capital side.

Call-Book.—A book kept for unemployed printers, in which their names can be entered, so that when a call for workmen is received they may answer in rotation. Such books are kept in the offices of the English societies and the principal American unions, and in a modified form by some of the Typothetæ. In the latter no rule is observed as to priority, except among workmen of equal qualifications and characters.

Calligraphy.—The art of beautiful writing. In the years which preceded printing this was a very valuable accomplishment, as a calligrapher not only wrote the manuscript, but frequently painted the elaborate initials. A good idea can be formed of the life and labors of a calligrapher by reading Charles Reade's Cloister and the Hearth.

Cambric.—This material was formerly used instead of parchment for covering tympans in fine presswork.

Cambridge Calf.—In sprinkled calf, where a square panel of mill-board has been laid on the sides, protecting it from the color. Part of the page is thus sprinkled and part not.

Cambridge (England).—Printing was introduced into Cambridge at an early date, but it is uncertain who the persons were who carried it thither. John Siberch settled at Cambridge in 1521, and styled himself the first Greek printer in England. Erasmus was then in that town, and, it may be presumed, superintended the printing of his own works. The earliest University printers were Nic. Sperring, Garratt Godfrey and Segar Nicholson. The Pitt Press was opened April 30, 1834, with great ceremony. It is a large building, forming three sides of a square, with a magnificent Gothic front and lofty tower. It contains a type-foundry and extensive apartments for every kind of printing operations. The superintendence is in the hands of syndics. Most of the printing done there is on learned and classical works.

Cambridge (Mass.).—Printing was introduced into the present United States at Cambridge, Mass., in the year 1639. The settlement of the colony of Massachusetts began in 1628, at Salem, and in 1631 Newtown, now called Cambridge, was founded. A college had been begun there, and it was thought by the Rev. Joss Glover, a wealthy Dissenting clergyman in England, that a press should also be erected. He contributed liberally towards a sum sufficient to purchase printing materials, and for this purpose solicited and obtained, in England and Holland, the aid of others. In 1638, the means being at hand, he purchased the material, and engaged a printer to accompany it in a ship bound to New England. Mr. Glover, with his family, embarked on the same vessel, but unfortunately died on the voyage. He intended, it would seem, to carry on both printing and bookselling, as he had provided a quantity of paper and had a number of books for sale. Mrs. Glover, with her family, arrived in the autumn of that year, and settled at Cambridge, the next spring marrying Henry Dunster, the first president of Harvard College. He assumed the management of the press, and it was set up in his house. The first printer was Stephen Daye. He was from London, and served his apprenticeship there. He put the materials in order and began work in the first month of 1639, O. S. (March). The first work which issued from the press was the Freeman's Oath, to which succeeded an almanac. Daye continued to print until the close of the year 1648 or the beginning of 1649, at which time the printing-house was put under the management of Samuel Green. The Bay Psalm Book was the most considerable work done by Daye while in charge. It is a crown octavo of 300 pages, the type being Roman small-bodied English in size. Samuel Green was apparently not a printer when he began the work. He was a boy of sixteen when he arrived with Governor Winthrop in 1630. The president of the college was still the manager of the press while Green was there, as he had been when Daye was the workman. Another press was sent over, with type, by the Society for the Propagation of the Gospel among the Indians, some time before 1655. A considerable augmentation was received in that year, and the office was then well equipped with small fonts of nonpareil, brevier, long primer, small pica, pica, English, great primer, and a little long primer and pica Hebrew, Greek and blacks. The building occupied had originally been designed for a college for the Indian youth. Green then began printing the Indian Bible, a work of so much consequence as for a time to attract the attention of the nobility and gentry of England, and to make the press of Harvard College as noted as the presses of the universities at Oxford and Cambridge, England. The total cost was more than £1,200 sterling. Green continued printing for many years, dying in 1702, being then eighty-seven. No printing was done in Cambridge immediately after Green's death, and soon after his decease the materials were removed and probably sold. In 1718 Thomas Hollis, of London, a great benefactor to the college, presented it with a font of Hebrew long primer and Greek long primer. They were put into use but once, which was when the college published metrical addresses congratulating George III. upon his accession to the throne, the poems being in Latin and Greek. The types were never again used, the college building in which they were deposited having shortly after been burned. Other printers in Cambridge during Green's time were Marmaduke Johnson and Bartholomew Green. Printing was not again done there for many years after Samuel Green's death, but since the beginning of the present century has been a very large industry in that town. Of late years the Riverside Press and the University Press have given Cambridge a reputation of the very highest. No better work is done anywhere.

Cameron, Simon, an American statesman, was born at Lancaster, Pa., on March 8, 1799. He entered the printing business at nine years of age, working as a journeyman in Washington and several other places before he was of age. In 1820 he edited a paper at Doylestown, Pa., and in 1822 one at Harrisburg, in the same State, both being successful. He early acquired a great influence over other men, and was very skillful as a politician. He invested in banking and mercantile enterprises as soon as he obtained sufficient capital, and made money by them. He was appointed adjutant-general of the State in 1845, and a few years after was elected to the United States Senate from the State of Pennsylvania, holding that position at the outbreak of the Civil War. He was a candidate for the Presidency before the Republican nominating convention at Chicago in 1860, but was defeated by Lincoln, who offered him the post of Secretary of War when he assumed office. The first months of the conflict were unsuccessful on the Union side, and a cry was raised against Mr. Cameron and the older generals on that account; and it was also charged that he was too favorable to the contractors, who were likely to cast discredit upon the nation. Yielding to these assaults upon the Secretary of War, Mr. Lincoln nominated him to an honorable position abroad, that of Minister to Russia, and Stanton took his place at the head of the War Department. After the war Mr. Cameron was again elected to the Senate, where he wielded a most powerful influence, but finally resigned, and was succeeded by his son J. Donald Cameron. For the whole of his later life he was regarded as the impersonation of the successful country printer, who had attained fame and power in consequence of the training he had received at press and case. For many years the editors who had been instructed as printers exercised a vast influence in the politics of the State and nation. Cameron in Pennsylvania, Weed in New York, Hill in New Hampshire and Ritchie in Virginia were only a few of these. After leaving the Senate Mr. Cameron led a life of retirement, visiting Europe, however, when he was nearly ninety years of age. He died on June 26, 1889.

Campanelle (Ital.).—A letter or letters which slip by at the ends of lines.

Campbell, Andrew, the inventor of the presses known by his name, and a mechanical genius of great ability, was born in Trenton, N. J., in 1821. He was reared in poverty, and before he was fifteen went West, partly on foot, and apprenticed himself to a coach-builder in Illinois. At the expiration of his time he went to St. Louis, where he aided in the construction of the first omnibus ever used in that city. Within the next few years he engaged as a dealer in machinery, a builder of bridges and an inventor of a machine for turning match-boxes, and was also a farmer. He went to New York in 1853, the time of the Crystal Palace, and was much interested in the machines he saw there. It was believed by those who met him that his brains would be of advantage to them, and he was engaged by A. B. Taylor & Co. as the foreman of their printing-press manufactory. Before filling this position he was employed for some time in building a machine for feeding presses. He remained with Mr. Taylor till 1858, extending his business and introducing several novel features. While there he designed and built, by special contract, a press peculiarly adapted to the printing of illustrated papers, such as Frank Leslie's and Harper's Weekly. The press-building of the United States was then substantially in the hands of Hoe and Taylor, the former having by far the larger share, and Mr. Campbell felt that another manufactory, paying particular attention to presses for country newspapers, must be successful. For several years he experimented on this line, but it was not until 1861 that he felt he had gone sufficiently far to warrant him in beginning business for himself. The new machine proved to be a great success, and continues to be popular to this day, although many competitors have arisen. In 1866 he erected a manufactory in Brooklyn, costing $80,000. He continued there for a number of years, bringing out a great number of new designs, each worthy of attention. To obtain increased capital a joint-stock company was formed, and the works enlarged, but in time disagreements began to exist between him and the other stockholders, and several years ago he retired. After this he designed a press for the Bagley & Sewall Press Company, of Watertown, N. Y., and was engaged in the construction of other machinery. His death, which was on April 13, 1890, deprived the printing-press manufacturers of America of one of the brightest minds which had ever graced their calling.

ANDREW CAMPBELL.

Campbell, John, the first publisher of a newspaper in America. The paper was the Boston News Letter. It appeared Monday, April 24, 1704, and was published by him and others for nearly seventy-two years.

Campbell Press.—A very well-known press, running very easily, and embracing many desirable features, invented by Andrew Campbell, and since improved upon. These machines embrace the entire line required for typographic and lithographic work. They comprise a Country press, which has been much used; a two-revolution press, of several sizes and forms; an Oscillating series; a Complete press, upon the same plan as the Country, but stronger, heavier and more perfect. There are several styles of lithographic presses.

Campbell, Samuel, a Scotchman who learned the occupation of a bookseller and came to the United States shortly after the conclusion of the Revolutionary War, beginning business in New York with capital loaned him by his former employer. He was very successful, following printing, binding, bookselling and publishing.

With Messrs. Hodge and Allen he printed and published the first Bible ever issued in New York. He continued in business as a bookseller until about 1825, and died on June 26, 1836, aged seventy-three. He was largely interested in the paper trade, owning paper-mills in New Jersey, and having been one of the first to sell paper in New York on commission. This was about 1819. Paper dealing is continued to the present time by his successors, Augustine Smith & Co.

Canada.—Upper Canada, now known as Ontario, was a waste at the outbreak of the American Revolution, and Lower Canada, now called Quebec, was inhabited only by the descendants of the French, who had been conquered a dozen years before, and a few soldiers, traders and adventurers. The population of the two provinces at that time was very small. Printing began at Quebec about 1764, by Brown & Gilmore, doing work in both English and French, and next in Montreal. Since the settlement of the western half of this region many enterprising newspapers have been begun, and there are many book and job offices. The largest places, in this connection, are Montreal and Toronto, each of which does a great deal of printing. The Government Printing-Office in Ottawa is a very large one. Quebec and Hamilton do much, and there are a dozen places like Kingston and London where the amount of work turned out is very respectable. The number of newspapers published in Ontario in 1890 was 482, of which forty-four were daily; and in Quebec, 141, of which eighteen were daily. Besides these two provinces the Dominion of Canada contains British Columbia, Manitoba, New Brunswick, Nova Scotia and Prince Edward Island. The total number of newspapers in the Dominion is 803, of which eighty-seven are dailies.

Canada Balsam. — An ingredient formerly much used in printing-inks, not only by wholesale manufacturers, but by printers who made their own. It was highly recommended by Lynch and Savage. The balsam does not dry quickly.

Cancel.—1. Canceled matter is that which is set up but has not been worked off, and is to be distributed. In hastily-written books, where a number of persons are employed to bring them out at once, it may happen that what has been prepared by one is very much better said by some one else, or that it is inexpedient to print a portion. 2. Canceled sheets are those which are condemned in the pressroom as unfit for sending out. They may be too gray or too dark, or may have some objectionable matter or some startling error. 3. In bookbinding, all sheets or leaves are said to be canceled which are not allowed to be bound. 4. Canceled plates are those stereotype or electrotype plates which have been laid aside, better or more correct plates being used instead of them. In printing-offices or electrotype-foundries where this happens a steel punch, with the word "Canceled" engraved upon it, should be driven into the back by a hammer. Ordinarily speaking, however, it is better to have them melted up at once. 5. A reprint of a leaf or leaves owing to a mistake—literary or technical—and usually indicated by an asterisk in the white line, which serves the place of an additional signature.

Candlesticks are still made for compositors, so that they can be put in one of the small boxes of the case, but they have nearly been driven out by petroleum and gas. They are of lead or iron. An expedient much resorted to in country offices in former days was to whittle a potato or turnip in the right shape to fit closely into a box, a circular hole being made in the centre for the candle.

Canon.—The largest size of type that has a name of its own. It is four lines of small pica, being larger than double paragon and smaller than four-line pica. On the point system it is forty-four points, and measures in depth about three-fifths of an inch. Hansard's Typographia in 1825 lays down the correct size of this type as eighteen and a great primer to a foot. French canon, a term not now used, is a little larger. The equivalent terms for French canon and canon are in French, gros canon; German, Missal; Dutch, Parys Romeyn, and Italian, canone.

Canoncino (Ital.).—Body 28 of the Italian series, or four lines of minion. It lacks very little of five lines of nonpareil.

Canone (Ital.). — Canon. There are two sizes of this. One is body 40 and the other body 44 of the Italian series. The former would be equivalent to body 43 and the latter to body 47 of the American point system, or a little less than four-line small pica and four-line pica, respectively.

Cap.—1. The paper covering which is over the edges while the book is being covered and finished. 2. An abbreviation of capital, much used. 3. The flat piece of wood, in a wooden hand-press, which was upon the very top, extending from one cheek to the other, and having a mortise on each side, so that the ends of the cheeks could be tenoned in. It was ornamented with a molding and projected slightly. 4. An abbreviation for foolscap, much used.

Capitalizing.—Originally there was no reason why there should be both capitals and small letters, and it is not believed that the first alphabets had more than one series. The haste of writing made, in some instances, a second series, smaller than the first and less formal. But all languages do not have both kinds, as, for instance, the Hebrew. In Rome whole sentences at times were written in uncials or capitals, but the general usage of the Greeks and Romans was to place one to each of the most important words and none to the unimportant ones. Two or three centuries ago one word out of every five or six was capitalized in English and French, but by the middle of the eighteenth century capitals were usually kept down. Dr. Franklin complains in one place of the dull uniformity which, in his old age, was the custom of printing-offices. Since 1800 few capitals have been used, but the practice is not uniform in different places. Some use many more than others. It will be remembered that Ignatius Donnelly formed his theory that Bacon wrote the works of Shakespeare by noticing how irregularly the capitals were used. In that day, if the lower case ran low, the capitals were used to eke out, and so were the Italics. During the transitional period from the free capitalizing of two centuries ago and the scant capitalizing of to-day many theories have come forward. Extracts are given here, with the dates annexed, to show the progress:

> The Administration of Justice and the Laws being in such Hands, it was no wonder that the poor Protestants in Ireland wish'd rather to have had no Laws at all, and be left to their natural Defence, than be cheated into the Necessity of submitting to Laws that were executed only to punish, and not to protect them.—*Welwood's Memoirs*, 1689.
>
> Let this deter Man from exercising Cruelty to any of his Beasts that are now given him for Servants, which ought to be us'd with that Gentleness and Compassion which Reason and Humanity will direct.—*Parker's Meditations*, 1735.
>
> There has been lately several Murders of Indians in the different Provinces. Those committed in this Province will be duely enquired into, & the Murderers executed as soon as found guilty. They are all apprehended & secured in Gaol.—*Letter of William Franklin to Benjamin Franklin*, 1766.
>
> General Washington cannot leave this place without expressing his acknowledgments to the Matrons and Young Ladies who received him in so novel and grateful a manner at the triumphal arch in Trenton for the exquisite sensations he experienced in that affecting moment.—*Washington's Letter to the Ladies of Trenton, April 21*, 1789.
>
> That all side, bottom, or incut Notes, be each of them, whether occurring together or separately, paid for at the rate of 25 cents per sheet; and should they exceed what is considered as moderate, the price shall be struck by the Journeymen of the Office and the Employer.—*First New York Scale of Prices*, 1800.

It is agreed that the first words of paragraphs and complete sentences must be capitalized, as well as the first word in a line of poetry; yet the difficulty arises at once as to what a paragraph is and what a complete sentence is. In poetry there is one well-known exception in poetical versions of the Psalms, where the lines are alternately seven and six syllables. Here in many books the second line is not capitalized, because it metrically belongs to the preceding one. Proper nouns and words which by construction or implication are proper nouns are also capitalized. The difficulty arises in the application. Should we write Hudson River or Hudson river; Westchester County or Westchester county; John Jones, Esq., or John Jones, esq.?

The rules on this subject are those laid down by the best grammars and books on printing, but to many of them great exception will be taken. It is well in beginning a book for the proof-reader to make notes of the capitalizing his author seems inclined to follow, or when it is to follow the rule of the office put down the preferential form of words about which doubt may arise. It is difficult to know where the dividing line occurs between capitalizing and non-capitalizing. Nearly all proof-readers agree that President should be capitalized when speaking of the President of the United States, and that other high offices should also be capitalized. Insignificant offices should not be. Where, then, in the line of officers, President, Chief-Justice, Senator, Governor, Lieutenant-Governor, Member of Assembly, Mayor, Sheriff, Alderman, Supervisor, Selectman, Deputy Sheriff or Constable, should the capitalizing stop? Nearly all would cut off all below the Sheriff, and many would do so below Lieutenant-Governor. Some would go still further. It is, therefore, necessary for the proof-reader to keep memorandums which shall show how he has decided in similar places, if he would have his work uniform.

Rules for Capitalizing.—The following classes of words should be capitalized:

1. All proper nouns, such as Cæsar, Africa, Mississippi, Ætna.

2. All nouns which by personification are given the attributes of persons, as:

> Truly we do but grope here in the dark,
> Near the partition wall of Life and Death.

3. Words in apposition, one of them being a proper noun, as William the Conqueror, Pepin the Short, Gregory the Great.

4. The name of the Deity, with the synonymes and periphrases, as Lord, the Saviour, the Lamb, the Redeemer, and also the personal pronouns relating to the Deity, but not the relative pronoun nor the derivative personal pronoun. Thus He, Him and His should be capitalized, but not whom or himself. This rule is not followed in the Bible nor in the Common Prayer Book, nor do many hymn-books, all these pronouns being kept down, and it is to be wished that their example could be followed instead of the one now prevalent. Pronouns relating to heathen deities are not capitalized.

5. The first word in every line of poetry. Yet there is one exception in some very long lines in church psalmody, only each alternate line being capitalized.

6. The first word of every complete sentence or paragraph.

7. The principal words in the names of books, as Murray's Grammar, the Whole Duty of Man, the Complete Poetical Works of Longfellow.

8. Heads and sub-heads of articles in newspapers and chapters in books, and tables of contents follow the same rule. No word, however, is considered a principal word that is an article or preposition, no matter how many letters or syllables it contains. Thus Ten Years amongst the Indians does not capitalize the word amongst. The older and stricter school of book-printers did not capitalize participles or auxiliary verbs. Some even carried the rule further and did not capitalize any verbs, as the Typography of the Fifteenth Century exemplified in a Collection of Fac-Similes, or an Inquiry concerning the Invention of Printing. Newspaper printers, however, nowhere conform to this rule, and the greater portion of the book and job offices use their capitals more freely.

9. Titles of high officers. Capitals are always employed when a common noun is used as an adjective describing the person, as President Harrison, Governor Hill or Mayor Grant, but many offices do not capitalize words when not immediately thus followed. They say George S. Coe, the president of the American Exchange Bank; William A. Camp, manager of the Clearing-House. All would agree in saying President Coe, Manager Camp.

10. The personal pronoun I and the interjection O.

11. Adjectives derived from proper nouns, as English, Asiatic, African, Shakespearian.

12. The first word of a quotation introduced with a colon. When it is not begun in the direct form, but is really incorporated into the sentence, it is not capitalized.

13. In many books words relating to the main subject are capitalized. Thus a Secretary of the Treasury might capitalize in one of his reports the words Public Debt or Sinking Fund. In De Vinne's Price-List he capitalizes Inferior Stock or Specky Paper, Hard-Surfaced Cards, and such words, in the centre of a common paragraph. General usage is, however, against this.

14. Nouns that accompany each other customarily, although only one may be a proper noun. Thus Hudson Avenue, Mississippi River, the Bay of Fundy and the Rocky Mountains are frequently capitalized, usage seeming about equally divided between this method and the contrary. When it is an adjective of location qualifying a noun usage seems to favor it, as Southern England, Southwestern Missouri, Northern Asia.

15. All great and important things are often capitalized, as the North Pole, the Equator, the City of London, the Littoral, the Desert of Sahara, American Slavery, the Republican Party. Republican is capitalized as a proper noun in this case, and Party from the operation of the rule.

16. Some authors capitalize the word The when it begins a compound proper name. This usage is erroneous, as if it is necessary then the whole sentence requires a small the before it, as the The Last Words and Dying Confession of John Sheppard. This theory is carried by some authors to this very extreme, but it is most favored by lawyers. The word "the," however, is in most cases only a word to round out the sentence, and has no real utility, as is shown by the fact that the Germans and French make a far different usage of it from ours. This usage would construct sentences like: "If the The Bible is not true," "In the The Complete Works of William Shakespeare," "It was said at the beginning of the American Revolution, in the The Declaration of Independence," &c.

Professed librarians, who have become wearied with the difficulties of making some exact rule fit every case, have attempted to put into force another rule, totally subversive of all others. No words except those at the beginning of complete sentences, or strictly proper nouns, are to be capitalized. Thus the librarians, the guardians of our printed literature, or of that portion which will be read in future ages, for the sake of ease overthrow all the usages and the nice distinctions which have been transmitted to us, and which make the printed page clear. Sentences from one of their catalogues, published in 1876, read thus:

The american genealogist.

Penny cyclopædia of the society for the diffusion of useful knowledge.

Encyclopædia britannica.

Neues conversations-lexikon; ein wörterbuch des allgemeinen wissens.

Historical, genealogical, chronological and geographical atlas. From the french.

Dictionary, english and dutch; woordenboek der engelsche en nederduytsche taalen.

Groves's greek and english dictionary.

This system is much as if, in order that architecture should be easily understood, all houses should be built on the same plan, as, for instance, like the three-story brick houses of Philadelphia, with wooden shutters and marble doorsteps, or that in order that pictures should be more easily framed none above or below a certain size should be admitted into a house.

Each language has its own way of capitalizing. The same rules are used in printing Latin in English-speaking countries that are required in English. Hebrew has no capitals. In Greek the proper nouns are capitalized, and those which begin sentences and paragraphs. German differs considerably from English. All nouns take capitals, but the adjectives from them do not. Thus we say in English, "the Arabic language;" the Germans say, in an oblique case, "der arabischen Schrift." In French, as a rule, the adjectives from proper nouns are not capitalized, but the usage with nouns is the same as in English. In French "la Révolution française" is written, but in English "the French revolution" or "the French Revolution."

Capitals.—In English these are twenty-six in number, with Æ, Œ and & in addition. They are generally placed in the upper case, although in job cases they may be on the right-hand side of the lower case, which has been compressed so as to leave some additional room there. They occupy four rows, with the exception of two boxes, but the Æ, Œ and & are elsewhere bestowed. Contrary to the practice in the lower case, they run in alphabetical order, with the exception of J and U, which were unknown at the invention of printing, and which have consequently been added at the end. This last row therefore runs X, Y, Z, J, U. All the capital letters exceed an en quadrat in thickness, except I and J, and they all have a heavy line in them, thicker than that in lower-case letters. All capitals are ascending letters, and one, the letter Q, is also a descending letter. They cover a great deal more of the top of the shank than a lower-case letter, the proportion being about seven-ninths in well-cut Roman fonts, but the lower case has only five-ninths. Much more ink is required for a form of capitals than one of lower case and capitals intermixed. The proportions of the characters do not run the same as in lower case, more I's being called for than E's, and the four most numerous capitals taking only one-fourth of the font, as compared with the four most numerous lower-case letters, which take one-third. In newspapers advertisements are frequently set almost entirely in capitals, and fonts run on them so that in many offices double the usual number of capitals are bought. They are much used in display work. The method of denoting a capital or words of capital letters in manuscript is by underscoring with three distinct lines; Italic capitals, four lines. In France the capitals are in some faces made smaller than with us, so that accents may be placed over them; but in English, where accenting is necessary, these marks must be justified over the letters or else special type must be cast. In job type capitals are cast with very little shoulder, so that a larger letter may come on the body, and in some faces there are many kerned letters.

Capped.—To cap balls was to wrap them up in a blanket, steeped with urine, that always being done when they were not in use. It kept them soft and in working condition, but they had to be scraped and dried with paper to get rid of the moisture each time they were wanted.

Caps and Small Caps.—A colloquial expression for capitals and small capitals, used together in headings. They are set in small capitals, the principal words, however, beginning with capitals.

Capsa.—In Rome, a covering for the manuscript rolls in booksellers' shops.

Caption.—The heading of a chapter, section or page.

Caractères, les (Fr.).—The characters, the letters.

Caractères en Bois (Fr.).—Wood type.

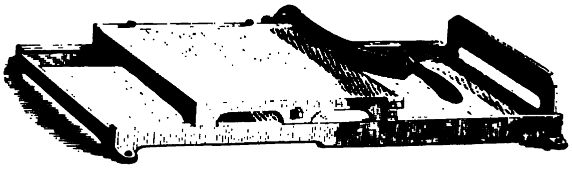
Carattere (Ital.).—Characters or letters.

Carbon Paper.—Black manifold paper used for duplicating. Between each sheet of black paper one of thin tissue paper is placed, this being repeated until there are twelve or fifteen of them, if necessary. Upon the top one the writing is then done with a hard stylus, and where the pressure reaches the sheets below a readable copy is taken off. The black sheet is charged with coloring matter and can generally be used many times.

Card and Bill-Head Presses.—A title once common, but now rarely heard, for the smaller kind of platen job presses. Many more cards and bill-heads are printed at present than in the days when these presses were invented, yet they form only a small portion of the vast mass of job-work. Card presses have been in use to some extent since 1830, the first good one, that by S. P. Ruggles, appearing about 1840. All early styles have, however, passed out of use. The smallest job press now made by the regular manufacturers is an eighth medium, which will print a sheet 6½ by 9. Those who make for amateur printers, however, have still smaller sizes. These latter would be more used if stronger, but as many of them are of inferior construction, with too little metal, they are unable to withstand the power of the impression and give way at the bed or platen.

RUGGLES ROTARY CARD PRESS.

Card-Cutting Machine.—A small machine specially made for the cutting of cards. Most printers in cities buy their cards ready cut, but those in the country cannot do so, owing to the length of time that might elapse before an order could be filled. In both city and country offices there are, too, odd sizes that are to be used immediately. To meet these demands a great variety of card-cutting machines have been invented. The older form is like a large pair of shears, the table upon which the large card lies representing the lower blade and the movable piece above the upper blade. Another form is a sharp-edged wheel, which travels across the card, and still another form is a knife that goes backward and forward. With all of these there is a rear



CARD-CUTTER.

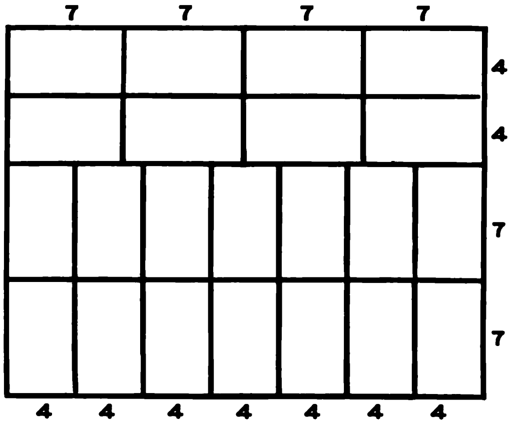
ledge, to restrain the sheet from slipping backward, and a gauge to prevent it from going too far the other way. The gauge being fixed at the exact distance from the knife that the card should be in size, cutting is begun, one strip after another being made till the whole is done; then the gauge is reset, and the cutting is completed.

Cards.—There is a frequent demand in all printing-offices for something stiffer and firmer than ordinary paper, and for such and other uses cards are devised. In the simplest form they consist of two, three or more sheets of paper pasted together so that the required firmness may be attained. There is a limit to the thickness of a sheet of paper as it comes from the mill. It becomes unmanageable after a certain size. It lacks stiffness; the inner material must be as good as the outer, and unless great pains are taken the face is not sufficiently smooth. This is obviated by having several rolls join each other in the manufactory, being pasted together by brushes. The paste in the high grades is of starch, but in the lower grades flour. The best card-board is that known as Bristol board. When really what its name implies it is of tub-sized and loft-dried writing-paper. Railroad blanks are made with manila on the inside, which renders them very tough. Most colored blanks are made so by pigments after the card is otherwise finished, but some are thus colored in the engine. The fancy embossed cards, such as those that appear like alligator skin or like leather, have these surfaces imparted to them by steel rollers through which they are passed or by plates between which they are pressed. The largest consumers of cards at present are the lithographers. They require for much of their work cards with an extremely fine finish, which is given them by a coating of china clay. Ordinary paper, although it appears smooth, is not so in reality, but is very irregular when viewed with a microscope. The hollows are filled up by the card manufacturer, and then to insure greater smoothness and lustre the whole is calendered. The clay is obtained from England and the South. After reduction by water, with which glue has been mixed, to the consistency of thick cream, it is applied by brushes to the surface of the paper. There are from fifteen to twenty manufacturers of cardboard in the Union, their product being mostly disposed of to the jobbers and dealers in that commodity in the great cities. These persons receive it in sheets 22 by 28 and cut it up or sell it uncut, as it may be required. A size 29 by 44 is much used by lithographers, and cardboard is also made of many other dimensions. Printers in small towns or in country districts use comparatively little of this material, a few thousand cards lasting them a whole year, but in the large towns the consumption runs up into many millions. A great deal is used by photographers, who must have a high grade; lithographers need more than printers; paper-box makers use large supplies, and there are many other occupations in which they are a necessity. See also under PLAYING-CARDS. There are a number of firms that make a business of putting ornaments and tints upon them and then selling them to the printers' supply men. They also cut them into odd forms. Gelatine cards, which are thin sheets of gelatine, are also sold by dealers, but except in shape and for the purpose for which they are used have no analogy to other cards. Wooden cards are also sold, as are snow-flake cards.

Two faces of ordinary cards are made, soft surfaced and hard surfaced. These distinctions are not known to the trade, but show the difference in the quality. Soft surfaces include satin, China, India and the common qualities of blanks or printers' cards, all of which have a soft, dull, unfinished surface, and when well made may be used for fine work as well as paper. Hard surfaces are porcelain, enameled, post-board, Bristol board, ivory, ivory surfaced and others, all of which have a hard polished face, and require newer type and much more care in making ready and in presswork. A very fine enameled surface was in use for a long time, but ceased to be called for twenty years ago, on account of the ink pulling off the face of the card, but less stiff inks being more easily obtainable at present they are now again occasionally used. Such cards should not be printed hastily, nor taken off suddenly.

The varieties of cards are very numerous. The white Chinas and coated blanks comprise litho-China, satin, enameled, thick China, railroad, fan-board, empire, coated manila or bond card and tough check. The white blanks, uncoated, have coupon blanks, thin and thick blanks, from three ply to twelve ply. The Bristols comprise mill Bristols, genuine pasted Bristols, Bristol blanks, white translucents and ivories from another class. Tough checks are cheap, extra and extra heavy, thick China, railroad, fine show-card, cheap show-card, coupon blanks, fine blanks, dull enameled blanks, enameled cardboards, manila tag-board, white tag-card, embossed cards and muslin-lined blanks.

There are ten usual sizes of business cards, and many other sizes for restaurant checks, tickets and other varieties. Card manufacturers have tables showing how many can be cut out of a sheet. Most printers, in endeavoring to find how many cards can be obtained, lay the proposed card on the surface of the sheet, and measure it, first one way and then another, till they get the result. But cards can be cut part one way and part another. Cards may be wanted 4 by 7. If cut one way from the ordinary-sized sheet there would be twenty cards, and a strip left of two inches by twenty-eight. If cut another way, there would be twenty-one cards and a strip one inch by twenty-two. Cut according to the following diagram there would be twenty-two cards and no waste:



If the job is a large one, in which waste will make much account, measure the surface in inches each way, multiplying these figures together; then divide 616, the total number of square inches upon a sheet, by the sum obtained by multiplication. Frequently such an experiment will reveal new possibilities. No greater number of cards can be cut than are thus shown, but sometimes only a considerably smaller number can be obtained.

The English sizes of cards are, for double large, 4½ by 6 inches; double small, 3⅝ by 4¾; large, 4½ by 3; small, 3⅝ by 2⅜; reduced small, 3½ by 2⅛; town, 3 by 2; broad thirds, 3 by 1¾; third large, 3 by 1½. American sizes of cut cards vary with the dealers, there being no absolute standard.

Caret.—A character used to denote an omission or an addition in the body. It is shown thus: ʌ.

Carey, Mathew.—An eminent bookseller of Philadelphia, the largest in America in the first quarter of the century. He was born in Dublin, Ireland, in 1760, in comfortable circumstances, and at the age of fifteen entered a printing-office and book-store. A pamphlet on dueling was published by him when only seventeen, and he shortly after issued another upon the severity of the penal code. Prosecution was threatened, and he was compelled to go to Paris, where he made the acquaintance of Dr. Franklin, who employed him in his private printing-office at Passy. He was absent a year. When he returned he edited in succession the Freeman's Journal and the Volunteer's Journal. His tone was so pronounced that he found it best to leave Ireland, and as the war was over between Great Britain and this country he embarked on a vessel bound for Philadelphia. General Lafayette, who was in that city at the time, gave him a hearty welcome, and lent him money which enabled him to make a new beginning. He founded the Pennsylvania Herald, and at once began bookselling and printing. He also reported the debates in the Legislature. About this time he fought a duel with Col. Eleazar Oswald, who was also an editor. He published the first Douay Bible printed in this country, and for many years issued the King James version. At one time he had the whole of one Bible, if not of two, standing in type. He was distinguished for his public spirit, his love of freedom and his enterprise. He wrote much upon social topics and upon political economy, and the list of his printed books and pamphlets is extensive. He was one of the original members of the American Sunday-School Society, and the publisher of the American Museum, a well-known magazine. His printing-office was a large one for that day, but as his business grew greater much of his work was transferred to other printers, and he confined himself to publishing and bookselling. He was active in promoting trade sales, and gave much encouragement to copper-plate engravers. In 1825, a considerable time before his death, which occurred on September 16, 1839, he relinquished business, which was taken up by his son, Henry C. Carey, the eminent political economist, and others, as Carey & Lea. The junior Carey had entered into partnership with his father in 1817. For many years Carey & Lea was the foremost publishing-house in America. One of its enterprises was publishing the Encyclopædia Americana, in thirteen volumes, a translation and modification of the German Conversations-Lexikon. It was edited by Dr. Francis Lieber, and represented for the day more capital and risk than a work ten times as large would require now. In 1845 Henry Carey Baird became a member of the firm, but in 1849 went into business for himself. Henry C. Carey retired in 1846 and the firm became Lea & Blanchard, and is now Lea Brothers & Co. In 1885 it celebrated the hundredth anniversary of the founding of the house.

MATHEW CAREY.

Carpenter Typesetting Machine.—This is a matrix machine, but does not cast a whole line, from two to seven letters being made at a time. The theory of the machine is that by simultaneous depression of two keys, one by the right hand and the other by the left, it is possible to make thirty-six hundred characters, being all of the common combinations. Each impulse, therefore, would assemble the matrixes for a word or nearly that, and three or four seconds would be enough to bring together and cast a line of nonpareil of the ordinary newspaper width. The matrix moves to a position just opposite the mouth of the mold, from which at the proper time sufficient metal is ejected to cast the syllable. This apparatus had, in October, 1890, advanced no further than to the metal model, so that it could not be seen what success would be attained by it in practical work. The inventor claims that ordinary hands will be able to do from fifty to ninety thousand ems a day, and experts may possibly reach two hundred thousand. The inventor, Samuel D. Carpenter, is a native of New York State, but has for many years conducted a newspaper at Carthage, Mo.

Carr, Robert, a veteran printer of Philadelphia, was born in 1778. He learned his trade of Bache, Franklin's son-in-law, and frequently carried proofs to General Washington and to Jefferson. He married Ann Bartram, granddaughter of the botanist, and afterwards devoted his time to botanical pursuits, but he had previously become celebrated for the excellence of his printing. He commanded a Philadelphia regiment in the war of 1812. His faculties were retained until extreme old age, and he delighted in reminiscences of the olden time, when he was printer for Tom Moore. He died on March 15, 1866, being then eighty-eight years of age.

Carriage.—In the wooden hand-press used in England eighty years ago the framework beneath the bed, upon which it rested, and made in such a way that it could slide in and out easily. It was in four long pieces, running the same way with the bed, and upon the centre two were pieces of polished steel, one upon each. The carriage was supported at each end by the forestay and by posts. Another signification is attached to this word in America, where it means the part that slides in and out upon which the form rests.

Carrier.—One who delivers a newspaper or magazine to the subscriber.

Carrier's Address.—A poem printed and delivered at New Year's at the expense of those apprentices of a newspaper office who deliver the journal, or by its carriers. A local poet usually writes it. The apprentices or carriers expect a gratuity from their subscribers on this account, the amount in all sometimes reaching as much as they would receive for six months' services. The custom has now largely gone out of use, after lasting for a hundred and fifty years. Newspaper proprietors will do well to set their faces against it, as it is at present very objectionable.

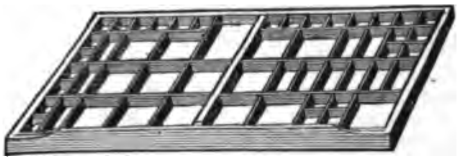
Carte de Visite Cards.—Cards cut 4⅛ by 2½ inches, used by photographers for mounting prints of that size.—*Jacobi.*

Cartridge Paper.—In England a machine-made paper exceptionally hard sized.

Case.—1. The shallow tray, divided into lesser boxes, in which the letters used for composition are placed. In this country each compositor has two cases, an upper and a lower one, which rest slightly inclined, but at different angles, upon his frame. They are known from their position as the upper and the lower case, the upper case being inclined the most. They are exactly the same in size, being 32½ inches long and 16¼ inches wide. The depth is one inch. The upper case is divided into ninety-eight equal boxes, forty-nine on each side of the crossbar, appropriated to the capitals, small capitals and less used marks. The lower case is used for the small letters, the punctuation marks, the figures and the blanks, letters from it being used far more frequently than those in the upper case. The division in America is generally into fifty-four boxes, thirty on the right side of the case and twenty-four on the left, separated from each other by a crossbar. Two general principles may be seen in the arrangement of the lower case.

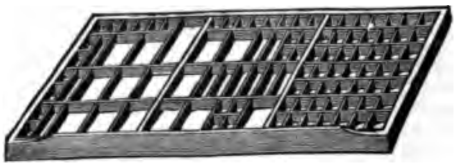
There is a rough alphabetical order, and the size of the boxes is regulated by the number of letters needed in composition. In typography some letters are much more in demand than others. Thus to 1,000 i's there will be 1,500 c's, 500 l's, 200 b's and 100 k's. It would be impossible to adapt the compartments exactly to these respective proportions, but it can be done approximately. The smallest box being taken as a unit, there are in the lower case twenty-eight of the small letters comparatively little used ; eleven of the next size, double the former ; i, s, o, a, r, h, the space, t, n, d, u, m, n and c have quadruple boxes and e a sextuple one. But if an exact ratio were to be preserved e needs a box sixty times as large as z, and a needs one seventeen times as large as q. In a quantity of reading matter taken indiscriminately the space and e, i, t, a, o and s are found more frequently than all the other letters put together. The larger boxes are brought nearer to the hand, therefore, than others, with the exception of the s, between which and the compositor are found the y and the p. They were thus placed when there were two s boxes—the long s and the short—and they have never since been changed. The rude alphabetical arrangement can be discovered by beginning at b, in the left-hand upper corner. There are thus found, running from left to right, and again beginning with the second and third tiers of boxes, many letters which were so placed because they followed the order of the alphabet. Others have been interpolated between them and some have been transposed, but there are enough remaining to show the original lay of the case. The top row of large boxes has b, c, d, e, f, g ; in the next are l, m, n, o, p, and in the third t and r. In the upper case there are two different plans for the capitals and two for the little used boxes. Until within fifty years it was the practice everywhere in England to place a galley upon the lower ledge of the upper case. This would cover three rows of boxes, and the copy, nearly always manuscript, would cover the remainder of the width. Thus, in order to be able to reach the capitals with ease they were placed at the extreme top, and the small capitals were at their side. But this is no longer the rule in the newspaper offices there, the capitals being assigned a more convenient position. It has not been the custom in this country within the memory of living men to place them thus. Whether it has been done so within a century cannot now be told, as our oldest American diagrams of the case are not older than 1818. In Stower's Grammar, published in 1808, the capitals begin at the upper left-hand corner and are then followed by the figures. Where the Americans put the figures in the lower case some of the less used sorts were formerly placed.

UPPER CASE.



LOWER CASE.

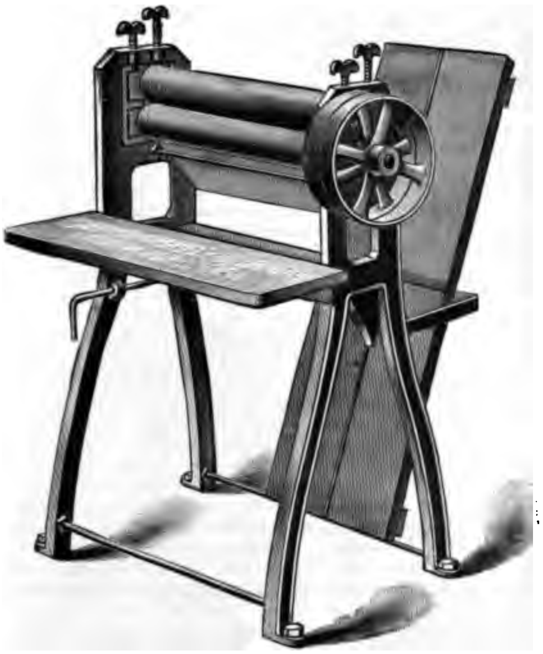
The general custom here was once to have the capitals at the left of the upper case and the small capitals at the right. This was changed on the daily papers forty or fifty years ago, and now seems likely to be generally adopted in all job and book offices. It is certainly more convenient to take capitals from the right than to twist partly around to get them from the left, and they are used twice as often as small capitals. In the Rooker news case the crossbar in the upper case is not in the centre, but a little to the left, so that there is more room for the capitals than for the small capitals. There is less space, also, above these letters, many less boxes being provided. It has been a subject of wonder to many printers that the case has not been materially altered within the last fifty years. There is too much space for the c, d, m, u, v and r ; the thin spaces and quadrats are separated from the thick space, and the s, as noted elsewhere, is thrown away from the stick by the interposition of y and p. An eighth of the space in the lower case could be saved, and a third of that in the upper case. Mr. Thomas N. Rooker, for many years foreman of the Tribune, regulated these spaces in a case he brought out twenty-five years ago, which is still in considerable use, but he ventured on no transpositions. We have no diagrams of the case at the time of the invention of printing, but since then three letters have been added to the printer's alphabet. The v and u were once the same ; the j was another form of the i, as can be seen in our word hallelujah, and w was double u or v. In many old books William is spelled VVilliam. When these letters were added they were put where they would be most convenient. The two last added, the J and U, are at the end of the alphabet in the upper case, not being inserted between I and K nor between T and V, as would naturally be supposed. In the lower case the w frequently changes place with the comma, and the j is sometimes found over the e and sometimes alongside of b. Radical changes have been made in the case by inventors, but the public has not accepted them. In 1857 or 1858 Mr. Rooker also brought down the capitals and small capitals into the lower case, which was made much larger than usual. They were situated directly over the principal box, and in the opinion of the compositors who worked upon the case this innovation made a saving in time. He also brought out another case in which every box was of the same size, but of different depths. Thus all were brought close to the hand, while the requisite quantity of letter was insured by the depth. When the characters grew scarce a turn of a crank at the side would raise the bottom of the box and bring the requisite letters to the top. The c box was twenty-seven inches deep. In Germany pairs of cases are very rarely used, while in France single ones are the most common in the cities. A recent French writer is not pleased with the consolidation of the two, as some of the letters are thrown out entirely, and the cases are very difficult to lift. That was an objection to the original Rooker case. Special cases are made for job-work, being two-thirds of the length of other cases, so as to place the capitals alongside of the lower case, and they are also made shallower. Font cases, or cases for the deposit of extra sorts, are also made. See FONT CASES.



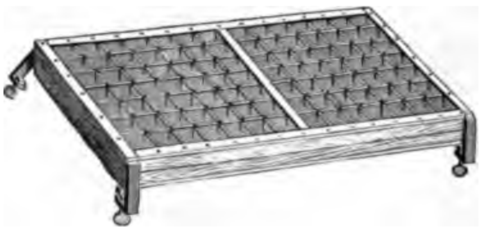
ITALIC CASE.

Cases especially adapted to other work than plain composition are frequently made. Those for foreign languages and for music are shown, each under its own head. But there is English work which varies much from that generally offered. Dictionaries require a great number of accented letters; algebra needs many sorts, elsewhere unused; and in tabular work figures, en quadrats, leaders and rules must be provided for. In the latter contingency a supplementary case consisting of the additional characters is sometimes fixed to the bar between the em and en boxes on the one side and the d and c on the other side. See TABULAR WORK. In other cases the least used letters can be transposed to the upper case and their place taken by the other sorts. Sometimes a box becomes entirely unused, as w when Latin is composed. In this case any ligature or extra letter can be laid in its place. Putting two thin letters alongside of each other should be avoided, or two letters that look much alike, as the long ſ and the f. There will infallibly be mixing of the characters.

The case should become no more than moderately full. The practice of many workmen of filling the boxes up even with the top, and then proceeding to heap up still more in the centre, even placing leads between the different compartments so that the boxes may practically be rendered deeper, should cease. It is only on daily papers and on the last day of weeklies that a compositor cannot distribute after he has once begun his day's work. Newspapers are never set in type larger than long primer, and if that should happen to be used so that no distribution can take place, the workman being swift, it is the duty of the office to provide him with two pairs of cases. That will give him a supply of twelve thousand ems. In the general run of bookwork and straightforward job-work an hour can be taken in the morning, just before noon, and an hour and a half before closing for the day. On daily papers the type is hardly ever larger than brevier, and a case of that or a smaller letter ought to give eight or nine thousand ems, without being too much crowded. Shaking cases to the extent sometimes seen should be strictly forbidden. A gentle inclination backward is generally sufficient. In boxes that have very few letters, these making a sort of flooring to the box, a corner should be moved with a brass rule, and then the fingers used to pull the others out of the places into which they have wedged themselves. Cases should be examined from time to time and repaired. By sending them to the manufactory mending can be done expeditiously and neatly, and the paper linings can also be renewed. All cases, even on daily newspapers, should be labeled. This will frequently prevent careless or dirty compositors from distributing wrong fonts into them. The labels should be at least double great primer. After being well pasted on and dried they should be varnished.



CASE-BENDING MACHINE.



CASE-CLEANER.

Case is frequently used in opposition to press. When the two are conjoined, case and press, it means the whole art of printing, case being the compositor's portion. In Scotland, and to some extent in England, case-room means the composing-room. "His case has been taken away" signifies that a man is discharged. "To hold a case" implies a steady situation. In French case is casse; the upper case is casseau supérieur or haut-de-casse; the lower case is casseau inférieur or bas-de-casse. The boxes are cassetins. There formerly was a word in French for a man who worked at case, cassier, but it is now entirely disused. In German cases are Kasten, and a box is Fach. See LAY OF THE CASE.

2. The cover of a cloth-bound book.

Case-Bending Machine.—A machine for bending the cases of books before they are put over the folded sheets, thus saving time and making the work always uniform. In addition it glosses the cover.

Case-Cleaner.—A contrivance by which a case with a wire bottom, but reversed from the ordinary case, is firmly attached to the latter, which is then inverted. Type cannot slip out or be dropped, as each box empties into the corresponding box of the wire attachment. The wooden case can then be removed and the bellows applied both to the case and the bottom of the type, now on top, thus completely cleaning them. When the type is put back again the two cases are again inverted and the operation is finished. This invention is a very useful one.

NEWTON CASE.

Case Department.—In Scotland, a phrase used for the composing-room.

Cases Down.—When cases are out of use and taken down from the frame the fact is thus expressed.—*Jacobi.*

Case, Newton, of Hartford, Conn., was born in Canton, Conn., in the year 1807. He was employed on a farm till his majority, then going to Hartford to learn the art of plate-printing. After a time he went to New York, engaging in the same occupation, but shortly after returned to Hartford and started a small office for printing maps, bank-notes, &c. In 1836 he, with two others, under the title of Case, Tiffany & Co., purchased the office of J. Hubbard Welles for $4,500. This had a number of hand-presses and considerable type. Two years after Philemon Canfield, who had the largest office in the State, disposed of it to this firm. They rented the building on Trumbull street formerly used as a jail, and adapted it to their purpose, there uniting both offices. In 1840 they began publishing a Cottage Bible, which proved a success, and afterwards published many other works, nearly all being productive of satisfactory business results. In 1850 a very large building was erected for the exclusive use of the firm, adding a department of bookbinding. In 1857 the title was changed to Case, Lockwood & Co., and the next year Leverett Brainard was admitted as a partner. In 1850 Mr. Case began the manufacture of Webster's Unabridged Dictionary, of which several hundred thousand were printed, and in 1867 he printed over two hundred thousand volumes of Greeley's American Conflict. Until about 1870 Mr. Case continued to take an active part in the business, but had latterly left the management in younger hands. He died in September, 1890, leaving an estate valued at $900,000, a large portion of which was given to the Hartford Theological Seminary.

Case Overseer.—The foreman of the composing department is sometimes thus designated in England.

Case-Racks.—Receptacles for holding cases when out of use, distinct from frame-racks, which are used for cases in use. In America these contrivances are usually characterized simply as racks.

CASE-RACK.

Case-Rules.—The English name for labor-saving rules.

Case Runs Over.—When the case has been over-filled.

Castrated Editions.—Editions from which some portions of the original text have been taken, because of offensiveness.

Case-Work.—1. That kind of work in bookbinding by which the covers are made separately from the book, and in quantities, in distinction from other work in which the cover is made on the book. Cloth-bound books and Bibles are the principal ones thus treated. 2. An expression sometimes used in England for defining the compositors' work in printing a book.

Casing Letter.—The operation of putting type in the cases when a new font is laid. A case is required for each fifty pounds of the font, when it is to be used continually. This is done in newspaper offices, but in book offices one hundred or one hundred and fifty pounds can be allotted to each case, as type does not return so speedily and as it is bulkier. After a sufficient amount has been taken from the papers to fill the cases comfortably the remainder can be tied up again and put away till required.

Casing-Paper.—A machine-made paper in England which comes under the head of browns, used for wrapping purposes.

Caslon, William, the earliest of the modern school of English type-founders, and one of the most eminent, was born at Hales Owen, in Shropshire, England, in the year 1692. He learned the art of engraving on gun locks and barrels in London, and afterwards set up for himself. His skill in making tools and ornaments for bookbinders attracted the attention of John Watts, an eminent printer of that day, in whose office Franklin was once employed, who encouraged him to pay attention to the cutting of letters for bookbinders. William Bowyer, another great printer, noticed these letters, and with Watts and Bettenham, another printer, lent him £500 to begin punch-cutting. He could obtain no information from any other person as to how preceding workmen had managed, and his subsequent success, which was undoubted, was entirely owing to his own ingenuity. His superiority over those who had preceded him was marked, and England was no longer compelled to resort to Holland for the types needed for good books. The chief characteristic of his work is its taste. The letters were neither thin and scratchy nor fat and ponderous, but they were admirably adapted to each other and to actual use. He was successful in business, and also esteemed as a member of society. He died on January 23, 1766, aged seventy-four years. He was thrice married, and left two sons and a daughter. William, the elder son, succeeded him. His wife, Miss Elizabeth Cartlitch, had two sons, William and Henry. The former managed the foundry, but in 1793 disposed of the foundry to his mother and sister-in-law, the widow of Henry Caslon. The elder Mrs. Caslon could never be persuaded that any attempt to rival the original William Caslon could be successful, and the business ran down. On her death Mrs. Henry Caslon bought her share, had new faces cut, and the foundry received a great impetus. She had a partner, Nathaniel Catherwood, but both died not long after success had been achieved, the former in March, 1809, and the latter in June of the same year. Henry Caslon, the son of Mrs. Henry Caslon, succeeded them in business. It is still continued in London, as H. W. Caslon & Co., no member of that family being interested at present. The last one died in 1873. The present manager is T. W. Smith. This foundry was the one which first reintroduced what is now known as old-style type.

WILLIAM CASLON.

Caslon Type.—A term sometimes applied in England to the old-faced types cut by William Caslon.

Cassa (Ital.).—A case.

Casse (Fr.).—Case; la casse des défets, the sort case—the font case.

Cassetin, le (Fr.).—A box (of the case).

Cassettini (Ital.).—The boxes of a case.

Cassettino del Diavolo (Ital.).—The devil's box; a box reserved for broken letters and pi.

Cassetto (Ital.).—Cases for brass rule, cuts, &c.

Cassie Paper.—Broken paper, from the French casser, to break. The term has now gone out of use, but a former writer on typography says: "A bundle of paper contains two reams, or forty-three quires, and twenty-four sheets to each quire, if perfect; if not, twenty quires to the ream, of which the two outside quires are called corded or cassie, as they only serve for cases to the ream. These outside quires are by the paper-maker made up of torn, wrinkled, stained and other damaged sheets, yet the whole quire very rarely consists of such sheets, but frequently some good sheets may be found in looking them over. But the general custom now is for booksellers and authors to send in their paper perfect. When, however, it is sent in imperfect it is the warehouseman's business to lay by the two outside quires, and cull them when most convenient; likewise to dispose of them so that they may neither be at the beginning nor end, but about the middle of the volume, or use them for jobs or proof-paper, for they are seldom as perfect as the inside quires." After the introduction of the Fourdrinier machine this practice was disused, and since 1842 has been obsolete.

Cast.—A direction at the head of a page or pages by the editor of a magazine or book that he has completed his final proof and that the plates can now be made. In some offices O. K. is used for the same purpose. This is supposed to be an abbreviation of "oll korrect," the spelling charged against Amos Kendall, postmaster-general in Jackson's time, who was said by his enemies to have spelled these words thus.

Castaldi, Panphilo.—It is claimed by the Italians that the invention of printing is owing to Castaldi. He was born of a distinguished family in Feltre, in the early part of the fifteenth century, and had attained reputation in 1456. He was a literary man, and was a poet of considerable merit. The story of his life is thus related by an Italian historian:

"Panphilo Castaldi was born in Feltre, of noble parents, at the end of the fourteenth century. He was highly educated and intelligent. Although a poet and a lawyer of good reputation, his love for literature induced him to open a school for polite learning, which soon became famous and attracted pupils from foreign countries. None of his pupils acquired greater reputation than John Fust, who is called Fausto Comisbergo by the historian of Feltre. This Fust resided with Castaldi in Feltre as early as 1454. In the year 1442 Castaldi had seen a proof of Gutenberg's attempts at the invention of typography. Gutenberg at that time (1442) was supported by the money of Fust and the skill of Schoeffer, his partners. After ten years of experiment Gutenberg had done nothing more than print from blocks of wood and with metallic characters. He had not yet invented movable types, for the Bible of 1456 should be classified with the block-books.

"Castaldi, more ingenious or more fortunate, had already invented movable types before the arrival of Fust in Feltre. It is well known that a century before the publication of the Mentz Psalter of 1457 initial letters and capital letters formed of glass were manufactured at Murano and used in Italy. These glass letters were probably the invention of Pietro di Natale, Bishop of Equilo. Castaldi had noticed that these letters were of advantage to the scribes, who printed them in their manuscript books. He at once saw that it would be possible to print entire books, instead of occasional letters, with movable types. The facility with which this invention had been made caused him to undervalue its importance. He gave the idea to Fust, who, returning to his partners in 1456 or a little before, enabled them to appropriate the invention of Castaldi. They greedily adopted this invention, and in 1457 they produced the Psalter, the first book printed with movable characters of wood."

Nothing is extant printed by him, and his invention, if it really was an invention, was a barren one. Castaldi died in 1470.

Cast-Iron Chases.—Chases made by casting in an iron-foundry. These, though cheaper than wrought-iron, are rougher and more likely to be fractured. When made by good foundries sizes as large as medium may be ordered.

Casting Up.—Measuring the quantity of work done, so that the compositor may be paid. The statement that all works should be cast up with the heads and directions inclusive means that in measuring the compositor should be paid for head and foot lines. Not used in America.

Casting Off.—Estimating how many pages a certain quantity of copy will make in type. This is a very difficult problem. Should the copy be reprint, it can be done quickly, a few lines of it being composed and the result noticed. But in manuscript it is not so easy. It may be in several handwritings and on pages of different magnitudes. This is nearly always the case in dictionaries and encyclopædias, and is frequently so in other works. When all the writing, however, is done by one author the task is more simple. Yet even in this case, owing to the greater number of paragraphs in one part than in another, the variations in beginning at the top of the page and ending at the bottom, and the interlineations and erasures, it is difficult to do more than make an approximation. There is also another thing to be noticed. A writer will frequently begin a book in a hand of a certain magnitude, but, that not being his customary one, he may, long before the work is concluded, fall into his natural handwriting, which may either be larger or smaller. Many books require no casting off; they are to be set until the work is finished, whether it makes four hundred or six hundred pages. But when there is a necessity for the copy to go into so many pages, the sheets of copy should first be accurately numbered, not trusting to the author's numbers. Then a dozen lines of copy without interlineations are to be taken from each of four or five different places in an ordinary book, or six to eight in a large one, which are to be set up in the measure proposed. If they run alike, the author's handwriting is probably very regular. If the twelve lines make ten of type, and there are thirty-nine on the page, then each sheet will require thirty-two and a half lines in the metal. The page, it will be supposed, has forty lines, there being nine hundred pages of copy. Divide the product of thirty-two and a half with nine hundred by forty and the number of pages can be told, which in this case is seven hundred and seventy-six and a quarter. Such would be the result if every page were exactly alike. But chapter headings must be allowed for, extracts go in smaller type, as do notes and poetry, and there is an average of nearly half a page lost at the end of each chapter. The amount of erasures must be computed, and also how much effect the interlineations will have in enlarging or diminishing the text. It may result from this calculation that there will be equal to nine hundred and eleven pages of copy, so that several pages more must be made.

A determination of this matter with exactness is of great importance. Each part of a book should be estimated separately. The title-page and its reverse will make two pages; a preface two, four, six, or as many as may be needed; the table of contents an even number of pages, although a list of illustrations may be run in with it; following this is the body of the work, possibly with notes or extracts in smaller type, and at the end a supplement, an appendix and an index. Each of these must be carefully computed and then the whole added together. There are several sources of error here which should be guarded against. If the computation was for solid pages, and it should afterwards be decided to change them to leaded pages, the ratio is not the same between the amount of matter in each if the type is small pica as it is if the type is long primer. In a page of nonpareil leaded the leads occupy one-fourth of the space; in pica one-seventh. Leaded matter should also have more liberal computations for blanks, chapter headings or space between paragraphs of different sized type, and in double-leaded matter the words must be spaced more widely apart. Type grows thicker as it gets smaller. Thus a page of 1,000 ems in pica would contain 1,361 ems in small pica, 1,777 in long primer, 2,250 in bourgeois, 2,777 in brevier, 3,361 in minion and 4,000 in nonpareil. But the 4,000 ems in nonpareil do not contain as much as four pages of pica; and it is doubtful whether they contain more than three and a half pages.

Upon this subject Hansard remarks that to cast off manuscript with accuracy and precision is an essential object, but a very unpleasant and troublesome task, requiring great attention and mature deliberation. Much difficulty and trouble are occasioned by copy irregularly written, containing interlineations, erasures and variations in the size of the paper; to these irregularities the attention must be closely directed, and they will too frequently baffle the best endeavors at calculation. The first thing necessary is to take a comprehensive view of the copy, and to notice whether it is written evenly, whether it has many interlineations, &c., the number of break-lines, and whether divided into chapters and subheads, so that allowances may be made in the calculation to prevent the plan of the work from being afterwards infringed upon. These observations should be entered as a memorandum on a separate piece of paper, to assist the memory and save the trouble of re-examining the manuscript.

This preparation being made, take that part of the copy for calculation nearest the general tendency of the writing, and reckon the number of words contained in one line, previously counting a number of separate lines, so that the one adopted may be a fair average; then take the number of lines in a page and multiply the one by the other, which again multiply by the quantity of folios (pages) which the manuscript copy may contain, and thus we are put into possession of the amount of words contained in the work with as little loss of time and as much accuracy as circumstances will admit; the necessary allowance should then be made for break-lines, chapters, insertions, &c., according to the observations previously made on the memorandum. If the information has been furnished as to what sized letter the work is to be done in and what the width of the page, the measure is to be made accordingly, and after composing a few lines of the manuscript copy we shall be enabled to form an opinion of the number of words which will come into each printed line; then take the length of the page and multiply the one by the other, which will produce the information previously gained from the adoption of the same made on the manuscript page; then compare their results, and if the manuscript drive out multiply the print by a larger number than the last folio of the writing; and so, vice versa, if the print drive out we multiply it by a less, until we bring the number of words to agree; the multiplier on the printed calculation will show what will be the last folio of the printed volume, which being divided into sheets according to the printed size of the work, it will be ascertained whether it will bear to be leaded, or the chapters begin pages, &c., or whether it must be made up close, the measure widened, the page lengthened, or the size of the letter reduced.

Should the size of the page and letter be left to the opinion of the printer, with no other order than the number of sheets the work is intended to make, by following the above mode he will be enabled pretty accurately to give his directions. We take the number of words in a line of manuscript at twenty, the lines in a page at fifty; we multiply fifty by twenty, which will produce 1,000 words in a page; we then multiply 1,000 by 422, which is supposed to be the number of folios in the manuscript, and we shall find it contains 422,000 words. The work being printed in pica octavo, twenty ems measure, and each line containing ten words, each page forty lines, the case will stand thus:

MANUSCRIPT.	PRINTED.
$50 \times 20 \times 422 = 422,000$	$40 \times 10 \times 1,055 = 422,000$

Having ascertained the number of sheets the work will make, and that number being sufficient for two volumes, they are divided accordingly. But should the author wish to have his work comprised in one volume, it is to be prepared with the sized type and measure which may accord with his inclinations. By referring to a scale of proportions, and placing a brevier by the side of the pica body, we find that a page will contain sixty-two lines instead of forty, and the same difference in the width, which will be one-half more than the former calculation. We therefore multiply sixty-two by fifteen words in a line, one-half added to the ten in pica, which will give 930 words in a page; multiply that by 454, it will produce 422,220 words; 454 will, therefore, be the last folio, should the volume be printed in brevier, which will be twenty-eight sheets and six pages. In works that are to be leaded, the calculation must be according to the thickness of the lead in the house in which the work is to be printed, as they are apt to vary; though in general three leads go to a brevier. [It appears from this that the leads in Hansard's time were thicker than are now used.] Therefore, in a work similar to the foregoing we should add one-third for leads, which will drive it out to 604 pages, which is more than a volume generally contains. If it should be thought too much the measure may be widened and the page lengthened.

Casuels (Fr.).—Jobs.

Catalogue.—A list or enumeration of names, titles of books or articles of merchandise arranged methodically. This class of work is a very important one in printing-offices. Catalogues originally were only statements in a very condensed form of the goods which dealers had to show, but they have increased in bulk and expensiveness until now some of them are among the most sumptuous books manufactured. The largest one published in the printing line in early days was a quarto specimen book of the Johnson Type-Foundry, issued about 1856, which cost many thousands of dollars. An expense of $10,000 for a catalogue is common, while $40,000 or $50,000 has frequently been spent. The page is as a rule a very large one; often there are a multitude of cuts introduced, which require great pains in getting ready. The book is frequently a thick one, and a strong and handsome binding has to be provided for it. Instances are known where the cost of catalogues has been more than $100,000.

Catch for the Bar.—In wooden hand-presses, two pieces of wood in the form of a cross, one part coming against the bar when it returns after making an impression. Its use is to prevent the bar going over too far.

Catches.—Made generally of brass, to hold stereotype or electrotype plates on blocks.—*Jacobi.*

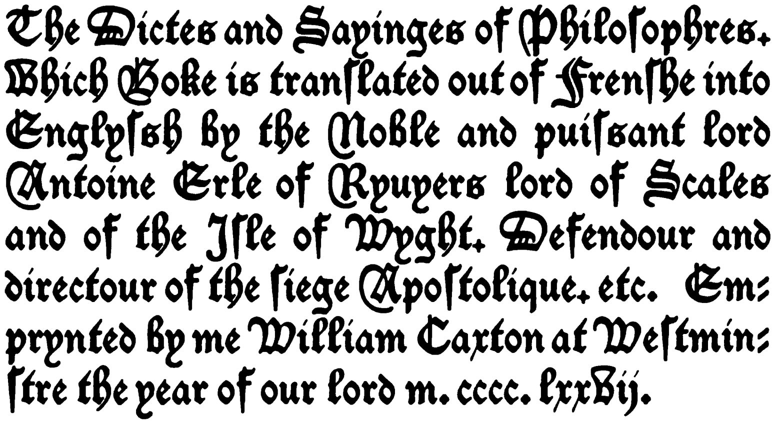
Catch-Line.—1. The line which contains the catchword at the bottom of a page. 2. A short, unimportant line placed between longer lines on a title-page or in a displayed job; such words as of, and, the, or, when standing alone in the centre of long lines, being catchlines.

Catchword.—A word placed at the lower right-hand corner of pages in old books, indicating the first word on the following page. The use of catchwords was in vogue till about 1807, but there are some instances much later. One English periodical, the Quarterly Review, still employs them.

Catenati.—Chained books. In the Middle Ages it was usual to chain books to shelves and reading-desks, and when, as often happened, a volume was too heavy to be lifted, the desk to which it was chained was made to revolve. In large households or baronial castles it was no unusual thing to find a book which was prized and valued by all attached to a table or stand in the great hall, so that those members of the family who could read had easy access to the volume. This custom of securing books by means of chains prevailed also in churches. A print is extant representing the library in the University of Leyden which shows that this practice extended down to the seventeenth century. Mr. William Blades has written interestingly on Chained Books.

Caustique (Fr.).—Lye or potash, used in washing a form.

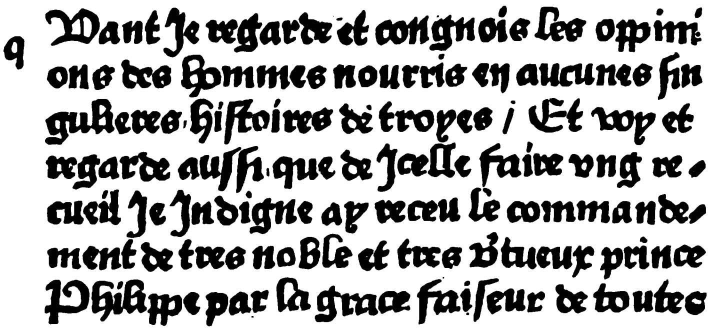
Cave, Edward, the editor of the Gentleman's Magazine, was bred a printer. His master, a printer of some reputation, named Collins, lived unhappily with his wife, and the years of Cave's apprenticeship proved very uncomfortable ones. He had received a good education, and after his time was out edited and wrote some books, then being made clerk of the franks. By his diligence and economy he at length saved enough to purchase a small printing-office, and began the publication of the Gentleman's Magazine, a periodical which has continued to our time, and which was for many years the chief English repertory of history and light literature. Dr. Johnson was for a long time its chief writer. Cave died on January 10, 1754, having been born on February 29, 1691. His sobriquet was Sylvanus Urban.



The Dictes and Sayinges of Philoſophres. Which Boke is tranſlated out of Frenſhe into Englyſsh by the Noble and puiſsant lord Antoine Erle of Ryuyers lord of Scales and of the Iſle of Wyght. Defendour and directour of the ſiege Apoſtolique. etc. Emprynted by me William Caxton at Weſtminſtre the year of our lord m. cccc. lxxvij.

THE DICTES AND SAYINGES.

Caris, Adam T., a printer of Washington, D. C., was born in Carlisle, Pa., on March 4, 1815. He entered the American Volunteer office in that town in 1815, and then went to Philadelphia, where he was under instruction in the type and stereotype foundry of Jedediah Howe. He published a newspaper at Harper's Ferry, Va., and was also employed in Washington. In 1847 he went to Charleston, S. C., there becoming the foreman of the Mercury, and later was a publisher of the South Carolinian, at Columbia, S. C. For two successive winters he and his partner were printers to the lower house. While in South Carolina he studied law and was admitted to the bar, but on the war breaking out he returned to Columbia, becoming foreman and associate editor of the Carolina Guardian. After the war he went back again to Washington, and in 1874 became a proof-reader in the Government Printing-Office, where he still remains. He contributed to the third, fourth, fifth and sixth volumes of Menamin's Printers' Circular a long and carefully-prepared account of the Columbia Typographical Society, an exceedingly valuable addition to the history of printing in America.



q Vant Je regarde et congnois les opinions des hommes nourris en aucunes ſingulieres hiſtoires de troyes / Et voy et regarde auſſi que de Jcelle faire vng recueil Je Jndigne ay receu le commandement de tres noble et tres vertueux prince Philippe par la grace faiſeur de toutes

THE HISTORY OF TROY.

Caxton, William, an eminent printer of England, and the first who practiced his art in that country, was born "in Kent in the Weald." The year is not known, nor is his family, but he describes himself in 1474 as an old man, and we know that he was apprenticed in 1438 to the mercer's trade. He must, therefore, have been born not far from 1419 or 1420. Robert Large, a dealer in cloths of high reputation, was his master, but he died in 1441, before Caxton's apprenticeship had expired. Very soon after this he left England for Bruges, in the Low Countries, then the centre of the trade in which he was engaged, and remained there for thirty years. In 1462 Edward IV. granted to an association of English merchants, the Merchant Adventurers, a new charter for the transaction of business, and Caxton was named its governor at Bruges. This position was a highly-important one, and his appointment indicated that he was a man of high consideration among his fellow-merchants. The sister of the king married the Duke of Burgundy at about this time and bestowed much favor upon the mercer, and by 1470 he had entirely relinquished his business for the household service of Margaret. He had long paid attention to the romances of the day and translated some of them to keep himself out of idleness. The first that he thus took up was Le Recuyell des Histoires de Troye. It was in great demand, and in order to oblige his friends he resolved to learn the new art of printing so that he might have more copies to lend. No year nor place of publication was mentioned in the book when it was at last given to the world, and bibliographers disagree as to the town where he learned the art. Mr. Blades, who is the highest authority upon this matter, is of opinion that he learned it from Colard Mansion, who about 1473 set up a press in Bruges. The next year the Recuyell was given to the world, being the first printed book in the English language. The Game and Playe of the Chesse was the second book, also printed at Bruges. In 1476 he left that town to return to his native country, and shortly afterwards began printing in Westminster, at the Abbey. Historians are not in accord as to the exact place, but it seems probable that it was in the location now known as the Almonry. There can be no doubt that it is from the circumstance of his printing at this abbey that the expression of a chapel, now used to indicate the workmen in a printing-office taken collectively, first sprung. Wynken de Worde afterwards occupied the same building. The first book that Caxton himself printed, and the first in England, was called the Dictes and Sayinges of the Philosophers. In the colophon are particulars of the publication, with the date, which was November 18, 1477. The type is identical with that in Mansion's later books. Part of the text was from Caxton's own pen. From this time forth for the remainder of his life he was indefatigable in his exertions with his press. He was not only a printer and publisher, but was also frequently a translator and author. It was necessary, too, for him to cast his own type, as there was no place from which such supplies could be purchased. A recent list gives the whole number of books issued by him as seventy-one, comprising more than eighteen thousand large pages, all done in seventeen years. Few of them are in any language but English, although he was an excellent French and a fair Latin scholar, and his influence was probably as great as that of any one in fixing the future of the English tongue. People bow to authority, and to the unlearned it seems as if there can be no arguing against the authority of a printed book. He did not cease bookmaking until his life closed. In 1491 he translated the Vitas Patrum, which was finished at last by Wynken de Worde, his apprentice and coadjutor, who in his colophon tells us that it was finished at the "last daye of his [Caxton's] lyff." It is not known exactly at what date his death occurred, but it was at about the end of 1491 or beginning of 1492. He was buried at St. Margaret's, Westminster, which adjoins the walls of the Abbey. No genuine portrait of him is known.

CAXTON'S DEVICE.

Caxton used six kinds of type. The sizes were two-line brevier, English, paragon and great primer. Of the two latter he had two faces each. If a book supposed to be a Caxton has a title-page, has any Roman or Italic type, possesses any commas of the ordinary shape, or uses catchwords, it is not genuine.

Caxton Machine.—A small platen jobbing-machine worked by foot or by steam power, made in Stockport, England.

Cedilla.—A mark below the letter c, to indicate it is to be pronounced like s. Where sorts cannot be obtained one can be made from a figure 5 turned upside down, thus: ç. In French it is cédille.

Celluloid.—A material formed of gun-cotton and camphor, which takes a fine polish, and is, when uncolored, beautifully white, resembling ivory. It has been applied to many uses in connection with printing, among others to the making of stereotype plates, imitation wood-letter and covers for books. In the stereotyping the engraving or the form to be stereotyped is first used to make a fine paper matrix, just as if a common metal stereotype was to be made. Then this matrix is laid flat on a smooth metal surface, and over it is laid a sheet of celluloid. The two are put into a hydraulic press, the temperature is raised to 300 degrees, the celluloid then being pressed into the matrix at a pressure of 400 pounds to the square inch. When taken out and cooled the celluloid plate is an exact counterpart of the original type, and for use is cemented to a suitable wooden backing. It is a highly inflammable substance, and is consumed with so much rapidity that it is impossible to put the fire out by any ordinary means.

Printing upon celluloid is more difficult than upon paper, as the substance is like ivory, and in addition to resisting the type does not hold the ink. This is overcome by using heat and by having a caustic substance in the ink that to a certain extent will dissolve the celluloid.

Cellulose.—The material forming the cellular tissue of wood, used as a material in the manufacture of paper. See PAPER.

Censorship of the Press.—The regulations which formerly prevailed in most European countries, and which are still in force in some of them, in accordance with which manuscripts, printed books, pamphlets and plays and newspapers are examined by officials, civil and ecclesiastical, appointed for the purpose, who are empowered to prevent publication or suppress any part of the text if they find anything in such books or writings obnoxious to the prevailing political or religious system or to the authorities. A general censorship of the press was established by the Roman Catholic Church as early as 1515, and is still enforced so far as its authority extends. In England there were licensers of books, who were for the most part bishops; a general system of censorship, established by a decree of the Star Chamber in 1637, remained in force during the Civil War, and was confirmed by act of Parliament in 1643. Against this act Milton protested in his Areopagitica: a Speech for the Liberty of Unlicensed Printing. The censorship was abolished in England in 1694. In France a general censorship existed from the invention of printing till 1789, when it was abolished; and it has since been several times restored with various ameliorations, and again abolished. It was finally done away with in 1830, though a modified system of censorship was afterwards established and still exists. In Russia there is a very rigid censorship of the press. In Spain the censorship was abolished by the constitution of 1837. In Germany, after great vicissitudes, the censorship has remained abolished since 1848. There is no authoritative censorship in Norway, Sweden, the Netherlands, Denmark or Belgium, but penalties are imposed upon those who offend through the press. In the United States the press is and always has been absolutely free from any form of political or ecclesiastical censorship. —*Century Dictionary.*

This is not strictly true. The press at Cambridge and at Boston was placed under the inspection of magistrates during the seventeenth century, and Bradford had much trouble with the authorities in Pennsylvania and New York soon after beginning operations. His first offense in Philadelphia was printing "my lord Penn," and he was compelled to withdraw the book and erase the objectionable words with a pen. During the existence of slavery in the United States newspapers sent from the North to the South were generally inspected there to see whether they contained inflammatory matter, and if they did postmasters frequently refused to deliver them, being sustained in this action during one or two administrations by the Postmaster-General. During the Civil War newspapers which were offensive to Unionists were sometimes stopped by the arrest of their editors, and in two cases files of soldiers prevented the access of editors to their own offices, thereby, of course, stopping publication.

Centre Bar.—The piece of wood in the centre of the case which divides the right-hand portion from the left. In the lower case it frequently has a depression in it, formed by compositors striking it with letters which they desire to turn in their fingers.

Centre Tools.—Tools cut for the ornamentation of the centre of panels and sides of a book-cover.

Centred Figures.—Small figures cast centrally on a larger body, generally used in numbering lines for reference purposes in poetical works.—*Jacobi.*

Ceriph or **Cerif.**—See SERIF.

Cerography.—The art of engraving on wax spread over a sheet of copper from which, through the galvanoplastic process, an electrotype is taken ready for printing. This process is frequently used in map-work, the lines thus made being very distinct.

Certificates of Deposit.—These are issued only by banks or bankers, orders seldom exceeding a thousand copies. They are printed two or four to the page of folded paper.

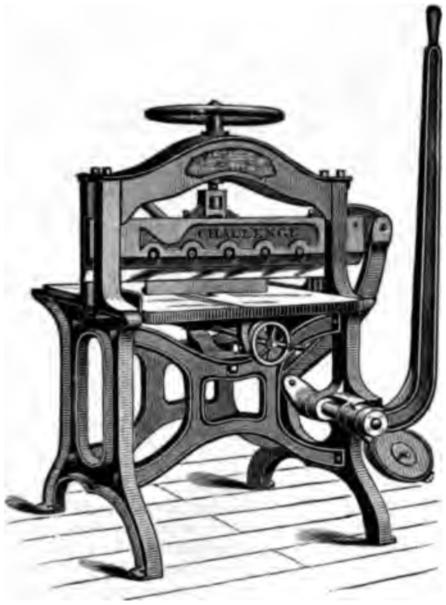
Certificates of Stock are usually printed one on the half sheet, whip-stitched and bound in oblong shape. Flat cap, 14 by 17 inches, is generally used.

Chalcography.—The art of engraving on copper or brass.

Chaldaic.—Chaldee letters, vowel points and accents correspond in every particular with the Hebrew characters.

Challenge Job Press.—A press in eight sizes, printing up to 14½ by 22, made in Chicago.

Challenge Paper-Cutter.—A paper-cutter made in Chicago, receiving power by the turning down of a perpendicular lever.



CHALLENGE PAPER-CUTTER.

Chamois.—The wild goat of the Alps; a kind of soft leather made from the skin of this animal, and used for bindings and many other purposes.

Champion Press.—A small job press made in New York.

Chaostype.—A background answering the purpose of a tint, but bearing a closer resemblance to a photograph of the prominences and hollows on the moon than can be found anywhere else. See Owltype.

Chap-Book.—A small book or pamphlet carried about for sale by hawkers. The word comes from the same root as cheap. Books to circulate among the poor must always have been cheap, as dear ones cannot be afforded, and from the beginning of printing, and even before, such works were sold by peddlers and hawkers. No particular form has ever been adopted for them, but they are in all shapes except that of the broadside. In the last century Newbery, who was the first children's publisher on a great scale in London, issued many little books for this purpose, and here after the Revolution Babcock of Hartford, Conn., was prominent in this way, many of the engravings being made by Anderson. John Low was the first printer of this kind in New York, a later publisher being Mahlon Day, the Quaker. France is now the principal civilized country where such books are numerously issued at the present time. Chap-book is not a term of the trade nor of the people in the United States; it is a bibliographer's expression.

Chapel.—The workmen in a printing-office, considered as a society. It is erroneous, as Mr. Blades points out in Notes and Queries, to consider this word as appertaining to the place of meeting. That may be in a beer-house, in a public hall or on the street. It is always a meeting of the duly enrolled members of a printing-house. Strangers are not counted, nor are men who are working casually. Substitutes have a voice for their principal, but not for themselves, even though they may have thus been employed for years. Apprentices are members of the chapel, but cannot vote, nor be authorized to act for the chapel. As used in the United States now it generally means an organization of the union printers employed in a certain house, but according to older and more correct usage it means any assemblage of printers thus taken collectively. There were chapels in New York, Philadelphia and Boston before unions, and Franklin has recorded what the chapel did in London in his day, although the London Society did not begin its existence for many years afterwards. An essential idea of a chapel is employment. Therefore, when men go out on a strike and leave the employment of a certain person, or are discharged by him, that chapel no longer exists. It is by the fact of non-employment dissolved. A chapel may consist either of men or women, or both, but cannot include persons who are not printers. If the employer has more than one printing-office there is a chapel in each, and the pressroom has a different chapel from the compositors. So if the establishment is a very great one there may be different chapels in the composing-room, job-room, tabular-room and so on. The meeting is presided over by the father or chairman of the chapel, who is elected for this purpose and who holds office as long as his fellow-workmen are satisfied with him. They are sometimes, however, elected for a definite period. If the father should not be present when action is needed one can be elected pro tempore. He is usually a middle-aged or old man, with much experience. A meeting can be called instantly, but it is usual to give warning, when possible, the written notice being hung up or passed around. In England there is a clerk whose duty it is to take care of the funds. Mr. Blades says "chapels are called upon to settle internal disputes among the workmen, to decide upon a common course of action when a trade dispute arises, to welcome the newly-fledged workman on the conclusion of his seven years' apprenticeship, and to consider applications for relief from the chapel funds." The last two reasons do not exist here. It is generally supposed that the term "chapel" came from the association of the first printing in England with the Abbey of Westminster. It is said the office was in a side chapel. McCreery, in his poem of the Press, says:

> Each printer hence, howe'er unblest his walls,
> E'en to this day his house a chapel calls.

"In extensive houses, where workmen are employed, the calling a chapel is a business of great importance," says Mr. McCreery, "and generally takes place when a member of the office has a complaint to allege against any of his fellow-workmen, the first intimation of which he makes to the father of the chapel, usually the oldest printer in the house, who, should he conceive that the charge can be substantiated and the injury supposed to have been received is of such magnitude as to call for the interference of the law, summons the members of the chapel before him at the imposing-stone, and there receives the allegations and the defense in solemn assembly, and dispenses justice with typographical rigor and impartiality. These trials, although they are sources of neglect of business and other irregularities, often afford scenes of genuine humor. The punishment generally consists in the criminal providing a libation by which the offended workmen may wash away the stain that his misconduct has left upon the body at large. Should the plaintiff not be able to substantiate his charge the fine then falls upon himself for having erroneously arraigned his companion—a mode of practice which is marked with the features of sound policy, as it never loses sight of the good of the chapel."

These chapels were formerly, Mr. Hansard remarks, the means not only of regulating to proper behavior the various tempers and characters that might be introduced into a printing-house in England, but of establishing a mutual charity for the purposes of relief in case of sickness or misfortune, in order to effect which each man subscribed a certain trifling sum, a penny or two weekly, to which the master regularly added perhaps five or ten times as much, by which contributions a fund was formed called the "box." When any member was visited by calamity a petition was drawn up, a chapel called, deliberation followed, and such a sum was voted as was thought necessary for temporary relief. In process of time this excellent institution, where "man from man could find relief," was perverted to evil purposes by being made a strong engine of combinations against the masters. In the first place, it was decreed that no man, however long he might have subscribed to them, should have relief from these funds if he had failed in his allegiance to the "committee," that is, if he was not prepared blindly to join in every combination and strike that might be proposed in order to force the masters to advance the prices of journeymen's work, to limit their apprentices, and to submit to such regulations as might be dictated by the invisible committee. The consequence was the masters refused to subscribe to or to be collectors and treasurers of a fund wielded for their own subjugation. The "chapel inquisitions" were then converted to scenes of drunken revelry, Mr. Hansard continues, and every man's candle, provided at the cost of the master, placed on the stone to illuminate the feast, or perhaps to a tribunal to decide who was and who was not a fair man, and should or should not be suffered to earn his bread and support his family, if he happened to have one, honestly by that profession to which he had been brought up. During this state of things masters frequently found the decision of their own chapel to be that every man who was, or might hereafter be, put upon such a particular work must immediately leave his employment, and, as a step further, that every man in the house must cease work until their demands were complied with. This usurpation was endured until the men became much more arbiters of the price, quality and time of doing a work than their masters were. The latter were forced into means to defend themselves. Chapels were in most houses abolished, and, a turn-out taking place about the same time, many masters were obliged to clear their houses of every journeyman and take apprentices and become themselves their teachers, or get them taught in the best way they could; and few masters, concludes he, who have retained the command of their houses and wish to be independent have since suffered or ever will suffer chapels to be revived in them.

Chapels once existed in Belgium and France. Boutmy, in his Argot des Typographes, defines it as a meeting of the printers employed in the same printing-office, who constitute a sort of brotherhood. Chapels, he adds, no longer exist. A chaplain was he who held the copies of the works printed in that house which belonged to the chapel, which claimed one of each work as a matter of right.

Chapel Money.—An ancient custom of allowing pecuniary commission by the tradesmen to members of a chapel. This custom still survives in England to a certain extent, but Mr. Jacobi justly characterizes it as a reprehensible one.

Chapel Rules.—Most chapels in England have a set of rules for the guidance of their members.

Chapelonians.—Members of any chapel in a printing-office.

Chapter Heads.—The headings at the top of a chapter. These should be sunk from one-fourth to one-sixth of the page.

Character.—A distinctive mark; a letter, figure or sign.

Charge.—To charge is, according to Moxon, to fill paper with great pages; a page with many and great lines; or, a line with many letters. We now say a full sheet, a full page, a full line.

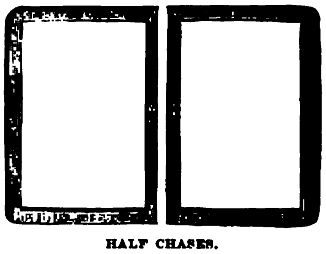
Charitable Work.—It is an erroneous practice to make low charges to benevolent societies, asking only half or a third of the value of the job because it is for charity. Full rates should be charged, and if there is any reason why a donation should be made it should be given in money.

Charleston, S. C.—Printing began in Charleston in the early part of the last century. Thomas and Ramsay assert that newspapers were first published in South Carolina in or about 1730 by Lewis Timothy. But King, in his History of the Newspaper Press in Charleston, gives the honor to Thomas Whitmarsh, who arrived there in 1731. He published the first number of the South Carolina Gazette on January 8, 1731-2. Inducements to some printer to go there and settle had been offered previously by the council of the colony, first in 1722, then in 1724, and finally in 1731. When Whitmarsh began his labors the town had then been fifty years in existence. About that time George Webb and Eleazar Phillips, Jr., two other printers, arrived in Charleston, but they do not appear to have engaged in business. Whitmarsh died in 1733, of yellow fever, and was succeeded by Lewis Timothy or Timothée, a French refugee. He died in 1738, and his paper was carried on by his widow, Elizabeth. In 1757 she was succeeded by her sons, Peter and Charles. They continued it till 1780, when the city was taken by the British. Other early printers were Charles and Mary Crouch, Robert Wells & Son and John Miller. A daily paper was published there prior to 1795, but when it began is not exactly known. Charleston has been a place of importance ever since its foundation, but since 1830 has grown slowly. It never has been a seat of book publishing, but its newspapers have been distinguished for their ability. Two of them, the Courier and the Mercury, were published for more than half a century each. The Adams was the first power-press used in Charleston, being introduced on the Courier September 1, 1834. It was propelled by hand until 1851. Walker & James first employed steam on book and job printing in that city in February, 1850.

Chart.—A sheet of paper or cardboard upon which information, arranged methodically in tabular form, is printed; a marine map.

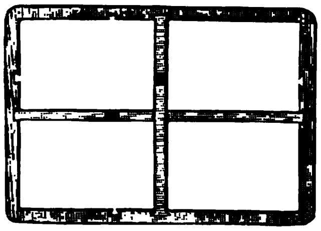
Chart Paper.—A machine-made paper manufactured of the best rags, specially adapted for charts and maps, being strong in texture and thin for folding purposes.

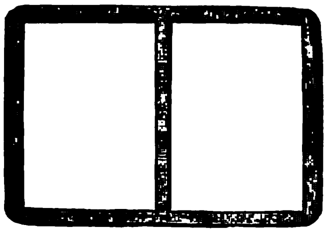
Chase.—The rim or frame around a page or form. On newspapers these are always of wrought-iron and with books generally so, but cast-iron ones are largely used in jobbing. They ought to be no larger than the form they inclose, after allowing for the lock-up, but it is impracticable to carry out this theory very strictly, as it would involve having too many chases. It is, therefore, common to use chases from the size wanted to those half as large again, the extra space being filled up with

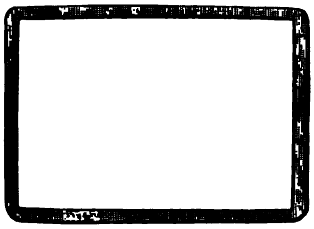


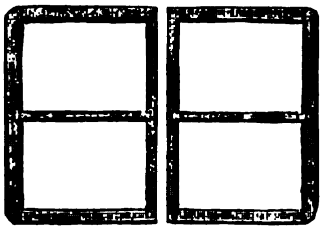
HALF CHASES.

furniture. The heaviest forms are those used on newspapers, and they therefore require the strongest chases. They run up in size to 44 by 56 inches, two pages being locked up in a single chase, and the forms will thus weigh in the neighborhood of five hundred pounds. In one office where such forms are made up the chase is of wrought iron, 1¾ inch thick all around, being no thinner at the head than at the foot. The crossbar between the pages is welded in. This crossbar does not need to be of extra thickness, as its straightness is determined by the good locking up of the pages on each side of it. Great care should be exercised in locking up forms, so that the chases may not spring. No matter how thick the chase may be, the mallet and shooting-stick can drive in enough quoins to cause it to bulge in some places. Chases are five-eighths of an inch high. Book forms have two bars in them, known as the long and the short cross. The short cross goes the narrow way of the chase, and the long cross the other way. In some offices these are welded in, so that there never can be any slipping. The short cross has its hollow or niche two-thirds the length of the chase, so that twelves and twenty-fours can thus be better imposed. Job chases are of all kinds. The small ones are usually of cast-iron, and are frequently made in such a way that a form can be imposed without having too much furniture. Thus for a programme the chase might be 8 inches by 32, or 6 inches by 24. Double chases are sometimes made, in which the inner one really secures the matter, while the outer one is only iron furniture in the shape of a chase. It is frequently expedient, when a small form is to be printed on a large press, to lock up the small chase inside of a larger one. Stereotype and electrotype chases are furnished by the stereotyper. Chases are sometimes made so that a job may go on a press which is hardly large enough for it. The thickness of some of their rims is less than half an inch. In law work, when printed by eight or four pages, the furniture can be cast with the chase, so that no other furniture is required when the sidesticks and quoins are in. One office in New York has several hundred chases made in this way, and has found them to work admirably. Screws and other uncommon devices for locking up are sometimes used with chases, for which see under LOCKING UP. Chases ought to be put where they can be kept dry. If they must be in a moist place they should be lightly rubbed over with an oiled rag. They are sometimes nickeled to preserve them, but this coating wears off after a while and must be renewed. A good pair of chases will last a long time if well taken care of. Some are in use now in New York that were made fifty years ago. If they get crooked they can be easily straightened.


CHASE WITH SHIFTING BARS.


CHASE WITH CROSSBAR.


BROADSIDE CHASE.


HALF CHASES WITH CROSSBAR.

Chasser (Fr.).—To drive out (words from a line).

Chassis, la (Fr.).—The chase.

Check-Book.—A tabulated schedule used by compositors to show at a glance the progress of a work, by which also the composition and charges upon it can be checked. An English expression.

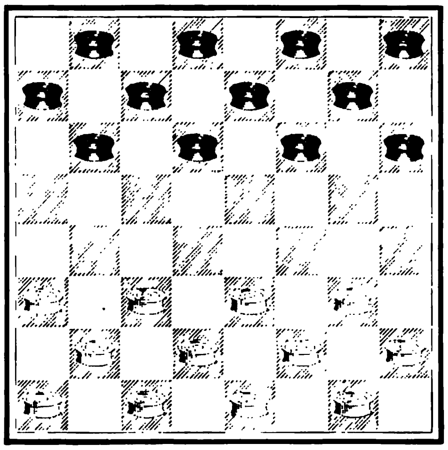
Check-Ends.—Ornamental designs placed at the left end of checks. They are frequently constructed of rule or border, and so arranged as to inclose the name or names of the person or persons who ordered them.

Check-Folio.—A flat writing-paper, 17 by 24 inches.

Check-Screw.—A screw in the hand-press to regulate the length of pull.

Check the Bar.—Pulling the bar of the press until it touches the near cheek.

Checkers or Chequers.—A game represented in printing by two characters, kings and men. Twelve pieces in each of the two colors are enough and five or six kings, as it is possible for the latter to reach this number. The diagram is square, each character being upon an em body. Around it a brass rule is frequently put. Each square is known by a number, so that there is no difficulty in setting up a diagram from written copy. Polish checkers are on a larger board, with one hundred squares, the common kind taking only sixty-four.


CHECKER-BOARD.

Checks are printed by lithography, letter-press or steel-engraving. The last is usually asked for only by wealthy corporations. Lithographed checks are very common. When checks are done by letter-press it is not uncommon to have a part in colors or to have a tinted background. The usual plan is only to set one when the order does not exceed a thousand checks, but for larger quantities two or three may be set. When a large number is to be done it will be found advantageous to electrotype the form five or six times. Double cap, 17 by 28 inches, is the most common size, with broad stub or inner margin. When flat cap, 14 by 17 inches, is used, it can be secured only by whip-stitching. Folio post, 17 by 22 inches, is the size preferred by banks for making books in large quantities. The stub is sometimes divided from the check by perforated rule, but the custom is not to do so.

Cheeks.—In a wooden hand-press, the main upright posts into which the other heavy pieces were fastened. They sprang from the feet, and were six feet one inch long. When circumstances allowed it, they were braced against the timbers of the ceiling or against some other support. At the lower part was fastened in the winter, a heavy transverse block ; a little above this was the till ; higher still the head, another transverse block, and at the summit was the cap. These all were fastened in by mortise and tenon, still further secured by screws.

Chemical Signs.—Marks used in chemistry. The most common of these, as well as the most necessary, are the abbreviations or contractions for the elements or supposed elements. They are drawn from the Latin names, and take no period after them. When one follows another no space is put between them. The marks for the elements are as follows :

Aluminium	Al	Iodine	I	Rhodium	R
Antimony	Sb	Iridium	Ir	Ruthenium	Ru
Arsenic	As	Iron	Fe	Selenium	Se
Barium	Ba	Lanthanum	La	Silicon	Si
Bismuth	Bi	Lead	Pb	Silver	Ag
Boron	Bo	Lithium	Li	Sodium	Na
Bromine	Br	Magnesium	Mg	Strontium	Sr
Cadmium	Cd	Manganese	Mn	Sulphur	S
Calcium	Ca	Mercury	Hg	Tantalum	Ta
Carbon	C	Molybdenum	Mo	Tellurium	Te
Chlorine	Cl	Nickel	Ni	Terbium	Tr
Chromium	Cr	Niobium	No	Tin	Sn
Cobalt	Co	Nitrogen	N	Titanium	Ti
Copper	Cu	Osmium	Os	Thorium	Th
Didymium	Di	Oxygen	O	Tungsten	W
Erbium	Er	Palladium	Pd	Uranium	U
Fluorine	Fl	Pelopium	Pl	Vanadium	V
Glucinum	Gl	Phosphorus	P	Yttrium	Y
Gold	Au	Platinum	Pt	Zinc	Zn
Hydrogen	H	Potassium	K	Zirconium	Z

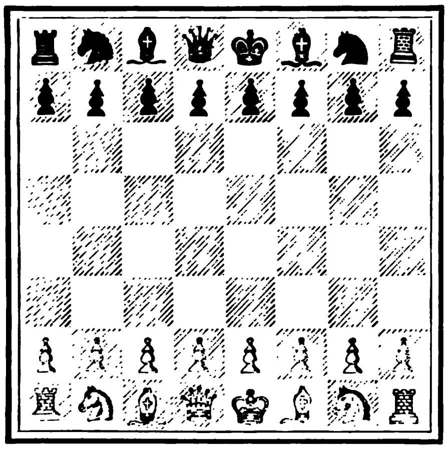
These symbols are used by all nations, with a few exceptions. In French one name for nitrogen is azote, and its symbol in that country is Az. The metal which the English call bismuth is called in Germany Wismuth, and its symbol is given as Wi. The Germans call tungsten Wolfram, and in their language as well as in English this substance is indicated by the symbol W. These symbols, when written together, mean that the substance is compounded of both elements, but does not give the proportion, which is understood to be that in which they will naturally combine. Thus CO denotes six parts of carbon united with eight parts of oxygen, which is the formula of carbonic oxide. But when figures are annexed to either it indicates that one of the proportions is to be increased in the ratio given. Thus CO^2 or CO_2 indicates a double portion of oxygen, or six parts of carbon to sixteen of oxygen. These figures may be superior or inferior ones, usually of the body which is one-half of that in which the text is. Algebraic marks are frequent in chemical formulas.

Chemiglyphic.—Engraved by means of a galvanic battery.

Chemitypy.—A process by which, after a coating of wax has been laid upon a zinc-plate, the latter is etched. The aqua-fortis is carefully washed away and a fusible metal melted in. The plate is then scraped down to the level of the zinc and placed in a solution of muriatic acid. The zinc alone will be eaten away, leaving the fusible metal in relief, in such a shape that impressions can be taken from it on the typographic press.

Cherokee.—The language spoken by the Cherokee Indians, who are among the most enlightened of that race in North America. When this country was settled by Europeans these Indians inhabited the highlands of Georgia and North Carolina, but the greater part removed in the early part of this century to the Indian Territory. They have had a printing-press in operation within their limits since 1830. The inventor of their alphabet, who repeated in modern times what Cadmus is said to have done in antiquity, was Sequahyah, known in English as George Guess, an Indian with a tincture of white blood in his veins, but knowing no other language than his own. The question arose among the Indians, while he was still a young man, whether the power of the "talking leaf" was a gift of God or the result of the reasoning power of man. Sequahyah held to the latter view, and in after-life his mind frequently reverted to the question. When he had become old and was suffering with rheumatism the thought struck him that he would count all the sounds in the language. Aided by his wife and children, he succeeded, but they were very numerous, and his efforts to mark them by using signs were unsuccessful, as the marks did not bring up the sounds to his mind again. He was really trying word-signs. But by using arbitrary marks he reduced them to two hundred, each one being a syllable, and by the aid of his daughter still further lessened them, till they were only eighty-six. Some of the characters he invented and others he borrowed from a leaf of a spelling-book that had fallen into his possession. This accounts for the fact that C is very far down in the alphabet, as he had no idea of the powers of the letters. He then obtained paper and pens from an Indian trader, and made ink from the juices of forest trees. His first marks had been made on bark. It became necessary then to make his invention known. He summoned the chiefs of his nation, told them what he had done, and submitted his discovery to proof. His daughter, who was his only pupil, was requested to go out of sight while his friends should name a word or sentiment, which after being written down was to be shown to her and she would repeat it. The trial was successful, and the chiefs gave him a number of the most intelligent young men to instruct. "The tribe watched the youths for several months with anxiety, and when they offered themselves for examination the feelings of all were wrought up to the highest pitch. The youths were separated from their master and from each other, and watched with the greatest care. The uninitiated directed what master and pupil should write to each other, and the tests were viewed in such a manner as not only to remove their doubts but most firmly to fix their faith. The Indians on this ordered a great feast and made Sequahyah conspicuous at it. He became at once schoolmaster, professor, philosopher and chief." Some of the letters are absolute inventions ; thus he took the Roman capital D for a, W for la, R for e, T for i, H for mi, A for go, Z for no, Y for to, and K for too. Other Roman capitals are used in the same unsystematic fashion, while some other letters seem taken from the Greek ; the Arabic numeral 4 represents se, and 6 stands for wo. He afterwards rediscovered a system of numerals, substantially like the Arabic system. Type was soon after cast for the tribe, and the alphabet thus made is still in use. Four newspapers are printed at Tahlequah. Guess was born about 1770, and died in 1842. His invention was made public in 1826.

Chess.—Chess is set on bodies like em quadrats, with or without a brass line around the diagram. There are sixty-four squares, consequently if the body is double pica it will require a measure a little over sixteen ems wide ; paragon would take about thirteen and a half ems pica, and great primer about twelve ems. Unless in a work on chess, type enough for one diagram is sufficient. There are a king, queen, two bishops, two castles and two knights on each side. The pawns number eight on each side. Each of these is to be represented either on white or black, and a number of the empty white and black squares are necessary. They are very easily set. Each square is known by a separate name, starting from the right hand, and numbered towards the adversary. There is a considerable literature relating to chess. The following are the characters:



CHESS-BOARD, WITH THE MEN IN ORDER.

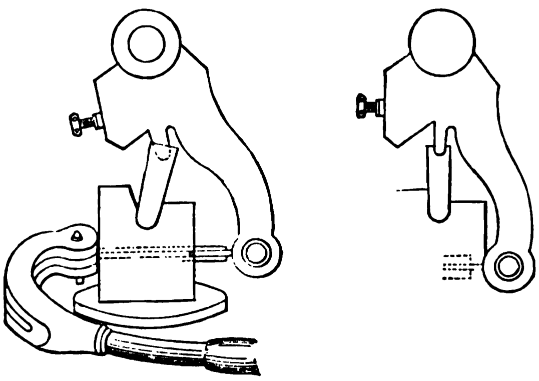
Chiaro-Oscuro.—A kind of wood-engraving formerly employed, by which lighter and darker impressions could readily be made. Three, four or five blocks were printed in succession. Outlines are upon the lightest; moderate shadows upon the second; deep shadows upon the third, and solid blacks upon the fourth. It is no longer used.

Chicago.—One of the principal cities of the United States, and extremely important in regard to printing. It was laid out in 1830, a military post, however, existing there from 1804. The first newspaper was the Chicago Democrat, issued on November 26, 1833, and the second was the Commercial Advertiser on October 11, 1836. A charter for a city was granted in 1837, and since that time its growth has been very rapid. Before 1860 a large amount of railroad printing was executed there, as it was close to the points of construction, and it has ever since been a chief centre for this work, and during the war its newspapers acquired national prominence. It was not, however, till the close of the conflict that the city assumed any importance as a book centre. The first large publication there was from the Lakeside Press, but within the past dozen years the printing of books and maps and their binding have been pursued on the largest scale. In maps Rand, McNally & Co. do more than any other American house. Much lithographing is done. It is claimed that the bookbinderies there are the largest in America. There are about three hundred printing-offices and one hundred bookbinderies altogether. Chicago has four or five type-foundries, two or three manufacturers of presses and printing materials, and a great number of supply houses. There are also many publishers. In newspapers extraordinary enterprise is shown. In 1880 the city had risen to the second place in this respect in the United States. In 1890 twenty-eight daily newspapers and 355 other periodicals were published there, covering every department of news and class journalism.

Childs, George W., the publisher of the Public Ledger in Philadelphia, was born at Baltimore, Md., on May 12, 1829. He began his business career by working as an errand boy in a bookstore, earning $2 a week. At twenty-one he was a partner in the firm of R. E. Peterson & Co., in Philadelphia, which soon became Childs & Peterson, publishing Dr. Kane's Arctic Explorations, Bouvier's Law Dictionary and Allibone's Dictionary of English Literature. He purchased the Public Ledger in 1864 for a small sum comparatively, but soon made it a very successful newspaper. Every improvement known to journalism or to the printer's art has since been introduced. He and his friend Mr. Anthony W. Drexel gave in 1886 the sum of $10,000 to the International Typographical Union, forming the nucleus of a fund which will be used for the establishment of a home for printers. This has since been much increased by the journeymen, many of whom in honor of them each year have devoted the value of a thousand ems for its enlargement. Those east of the Mississippi set the type on the birthday of Mr. Childs, May 13, and those west of the Mississippi on Mr. Drexel's birthday, September 13. Mr. Childs has also given a burial plot, worth $8,000, to the Philadelphia Typographical Society. His benefactions to good causes are countless. He has lately published in book form an Autobiography, an entertaining and valuable work.

GEORGE W. CHILDS.

Chill.—An elbow of steel, immediately at the end of the press-bar, which gives the impression by its being moved into a vertical position when the bar is pulled over.

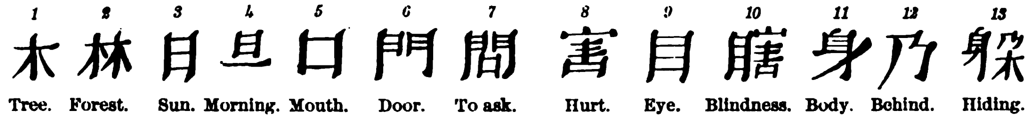


CHILL OF ALBION PRESS.

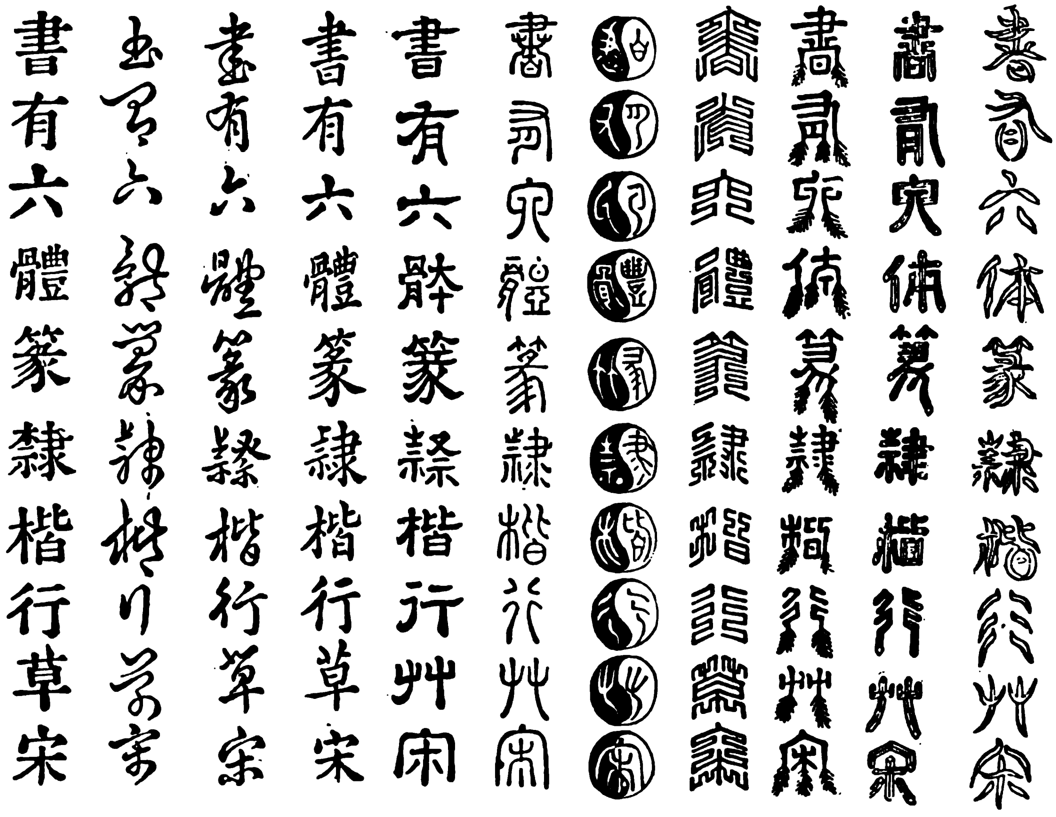
Chinese Paper.—A thin paper of very soft texture used by engravers to pull proofs on, erroneously called India paper.

Chinese Printing.—It is well known that printing existed in China for a number of centuries prior to the discovery of the art in Holland or Germany. Great respect is paid to learning in that vast empire, and proficiency in books is the easiest way to acquire political prominence. It is supposed that the first characters used in China were invented before the Christian era, being hieroglyphs. Each represented some material object, as an elephant, a child or a horse. The resemblance was small at the beginning, and after the forms became conventionalized no likeness at all could be seen. These forms were likewise inadequate in number to represent the highly complex wants and ideas of a nation so far advanced as the Chinese, and consequently many of them were combined for the purpose of conveying other and more occult meanings.

These characters form new ideas by duplication or combination. Thus No. 1 is a tree; a couple put together stand for a forest (No. 2). The sun (No. 3) above the horizon (No. 4) signifies morning. A mouth (No. 5) in a door (No. 6) represents to ask (No. 7). To hurt (No. 8) and the eye (No. 9) in one character indicates blindness (No. 10). The body (No. 11), behind (No. 12) and wood (No. 1) put together in one character (No. 13) convey the idea of hiding. When these were completed there still remained a necessity for many more, and they were devised phonetically. The latter form the bulk of the language. They often consist of an imitative symbol attached to one which indicates the sound of the whole. There are, according to one authority, 40,919 characters in Chinese; according to others there are 45,000. Four or five thousand well-selected characters, however, embrace all that is necessary for an ordinary student to know. Six thousand characters are sufficient for an ordinary missionary printing-office, as there is a wide range of synonymes, but magazines, treating of a greater range of subjects, require 10,000. Each of these is grouped under one of 214 radicals. Each character contains a radical, which by itself is also a character, the radical generally being placed at the left side, although occasionally elsewhere. Besides the intrinsic differences between the characters there are various styles in which they are written. Upon this page is presented an example of eleven different faces, as they would be called in printing. The first five, counting from the right side, are mostly fancy styles. The Chinese names indicate for the first an association to some fabulous bird, the second to some joiner-work arrangement, the third to suspended tassels, the fourth to a complicated oblique arrangement, and the fifth to the primum mobile, embodying the Chinese notions of the dual principle in nature and the universe. The sixth is the seal character, because it is used in seals and ornamental inscriptions, and is the most ancient form of writing. The seventh is an engrossing hand, and the eighth is the pattern style. No one can hope to obtain a literary name among his countrymen who cannot write neatly and correctly in this style. The ninth and tenth are running hands, the last being the freer of the two, and the eleventh is the closest to the printed character.



CHINESE IDEOGRAPHIC CHARACTERS, WITH THEIR SIGNIFICATION.

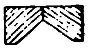


DIFFERENT STYLES OF CHINESE CHARACTERS.

The first Chinese records seem to have been written with a sharp stylus or iron point upon bamboo tablets. This proving too cumbersome, the hair-pencil was invented in the third century before Christ. With these pencils the characters were written on silk or cloth books, but as the cost of silk was very great such books were superseded about the year 105 A. D. by paper ones. The paper of China is made of bamboo. The material is first well soaked, then thoroughly pounded, ground or triturated, and taken up in molds. The present form of printing from blocks was adopted in the tenth century, Fung Tan having discovered a method of taking impressions from engraved tablets.

The first step in wood-block printing, says Gilbert McIntosh, of Shanghai, in the British Bookmaker, to which this work is indebted for the material for this article and for the illustrations, is to write the characters upon thin paper, properly ruled with lines, two pages, or one leaf, being cut on one block. A heavy double line usually surrounds the double page. The title of the work, chapter and paging are all cut in a central column, and when the leaf is printed it is folded through this column, so as to bring the characters on the edge and partly on both pages. In many type-printed books, however, the titles and paging are so placed as not to be folded through the middle of the characters, but to serve as a useful side folio, which is easily read in turning over the book from the beginning (or what is called in Europe and America the end). Marginal footnotes are placed on the top of the page. Where comments are greatly extended they are separated from the text by a heavy line, and occupy the upper part of the page. Where, however, such comments are brief they are inserted in the same column as the text, generally in double columns and smaller type. When the leaf has been written out as it is to be printed it is pasted on the block, face downwards. The wood ordinarily used is pear or plum, the boards being half or three-quarters of an inch in thickness, and planed smooth for cutting on both sides. When the paper has dried on the board it is carefully rubbed off with the wetted finger, leaving every character and stroke plainly delineated. The engraver then cuts away all the blanks round about and inside the character, after which the block is ready for printing, excepting, of course, altering or substituting for wrong characters, which is done very neatly by the engravers. The block is laid on a bed of paper and firmly fixed, so that there is no moving or chafing on the under side, on which there are also characters. The printer, seated before this bench, has on one side the pile of paper to be printed, and on the other side the pressing-brush, made from the fibrous bark of the gomuti palm. The pot of ink is placed in front, beside the wooden block. Taking the ink-brush, he slightly rubs it across the block twice in such a way as to ink it equally; he then places a sheet of paper across the inked block; over this he lays two others, which serve as a tympan. One or two sweeps across the block with the pressing-brush complete the impression, as the paper, being soft and unsized, can only be printed on one side.

The ink in ordinary use is manufactured from lamp-black mixed with vegetable oil, and is ground by the printers themselves. It is very often characterized by a most disagreeable smell. A pile of newly-printed native books can often make the atmosphere of a room uncomfortably tainted. In binding, each double page is folded through the central column, referred to before, the blank side inwards. In folding, the bookbinder has for a guide a double mark, converging where the fold ought to be made, shaped as in the margin. This is called a fish's tail, and is a perfect register mark and easy guide in folding.



FISH'S TAIL.

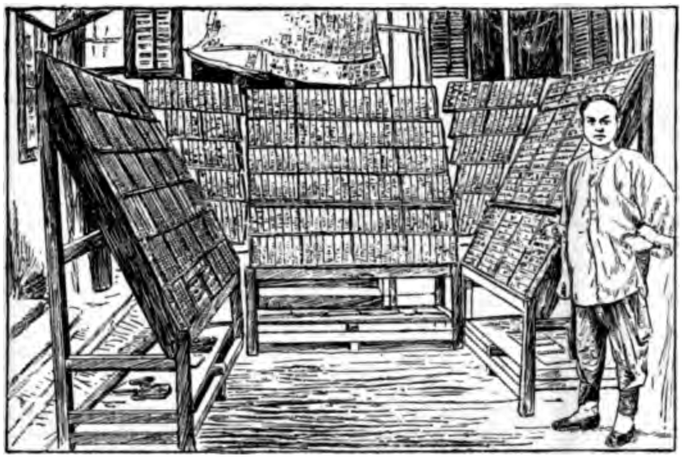
The sheets are next collated in volumes, and after titles, contents, prefaces, &c., are properly placed holes are punched down the back, and through these pieces of paper firmly rolled up are passed. The covers being now placed in position, the top, bottom and back of the books are cut. In China the cover does not go over the back. The cutting is done by hand, the instrument used being a large-bladed, keen-edged and heavily-backed knife, somewhat resembling a headsman's axe, excepting its being short in the handle. Placing his foot on the top board, which compresses fifty or more volumes, and also serves as a gauge, with several sweeps he neatly trims all the edges, excepting the front, of course, where the fold is made. The books are now separately stitched, thread or silk being used; silk cloth is also used at the top and bottom, to prevent fraying of the leaves at the back.

The arrangement of the Chinese book is as follows: Beginning at the end, according to our Western ideas, the outside title is in the upper left-hand corner of the cover. This is often printed in "seal" characters. Next is the title-page. In the middle is the title in large characters. The year of the reigning emperor is put in the upper part of the left column; below is generally the name of the printing establishment where the book is printed or published. In Christian publications the top of the right-hand column is filled with the date, according to our calculation: "Jesus descended to the world one thousand eight hundred and ninetieth year." Below this is often found the author's name. The next pages are, as a rule, filled up with prefaces, introduction and index. Then comes the ordinary letter-press. The characters read from the top to the bottom of the columns, and the columns read from the right to the left.

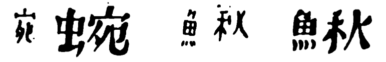
The honor of being the first inventor of movable types undoubtedly belongs, according to S. Wells Williams, to a Chinese blacksmith named Pi Shing, who lived about A. D. 1000, and printed books with them nearly five hundred years before Gutenberg began his work at Mentz. The letters were formed of plastic clay, hardened by fire. The porcelain types were then set up in a frame of iron, partitioned off by strips and inserted in a cement of wax, resin and lime. The printing was done by rubbing, and when completed the types were loosened by melting the cement and made clean for another impression. This invention did not supersede block-printing. Cut metal characters were afterwards used. Copper letters thus cut were used for printing a huge collection of books in the seventeenth century, but the types were afterwards largely purloined and wooden characters were substituted. A visit to one of the printing-offices in which native types were used was lately made by a missionary. There were about twenty tables around the room, upon each of which were cases. The compositor seized the type with pincers and pressed it into the clay at the bottom of a large shallow block, which answered the purpose of a chase with a bottom. It was a solid piece of hard wood about twenty-two inches long by fifteen broad, and perhaps three deep. The inside of this block was hollowed out to the depth of, say, a quarter of an inch, and this depression was still further hollowed out into grooves about three-quarters of an inch deep. The block noted had twenty-nine of these grooves, each groove being filled to the depth of a quarter of an inch with ordinary thick clay. Into this the character was pressed. When the form was complete a flat board was placed on the top and the characters pressed perfectly true and level with the surface of the wooden block, the edge of which was cut to form the border which is generally found around every Chinese page. This edge was, of course, immovable, and would be the same on every sheet printed from that form. All was now ready for the pressman. He received the form, carefully brushed the ink over the type, laid a sheet of paper upon the job and pressed it down all over so that it might be brought into contact with every character. He then removed the sheet and examined each character; some, which were not quite straight, were carefully adjusted with the pincers. The type was never touched with the fingers.

After sufficient copies had been struck off the type was distributed, each character being returned to its own box. The type in the form was of three sizes, but instead of being adjusted by spaces each character was kept in position entirely by the clay upon which it stood. The characters were square and made of some hard wood. The men told Mr. Elwin, the missionary, that the art of printing in this particular way had been handed down in their family from the Sung dynasty; no stranger was allowed to take part in it, apprentices always being taken from their own clan. Their terms for printing were a hundred cash (about a quarter of a dollar) a day, this to include use of type and ink; paper would be charged for extra. It seemed to be the custom in that neighborhood, if printing was required in any particular place, to hire the printers, who would remove thither, and set up their office on the spot.

Chinese movable types on metal were first cut on type metal or tin at Macao in 1815, for the purpose of printing Morrison's Dictionary. The work progressed very slowly, yet in time considerable material accumulated, and before the type was destroyed by fire in 1856 it had served to print over twenty dictionaries and other works for learning Chinese. In 1836 a type-founder in Paris, M. Le Grand, prepared an extensive font of type with comparatively few matrixes, by casting the radical and primitive signs on separate bodies. The small types show the radical and primitive separate, while in the large types they are combined. In 1838 the Royal Printing-Office at Paris procured a set of blocks, made thick castings from them, and then sawed the plates apart, making separate letters from them. More lately missionaries in the East began to cut punches, and in time were able to supply all ordinary needs. Matrixes have also been obtained by the electrotype process. The printing-offices arrange their letters by the radicals. Photo-lithography is extensively used by the Chinese.



CHINESE TYPE CASES.



CHINESE METAL TYPES.

Chinese White.—A colorless pigment used for thinning or blending colored inks.

Choked.—An expression used when the face of type gets filled up with ink and dirt, owing to the lack of thorough washing and rinsing.

Chromatic. — Relating to colors. Work done in more than one kind of color is frequently so called.

Chromatic Printing-Presses.—See PRINTING.

Chromatic Type.—Type so made that parts of characters can be printed in succession in colors in the same place, the letter then being perfect.

Chromo.—An engraving printed in several colors, usually by lithography.

Chromograph.—A process by which, after writing on a sheet of gelatine, copying can be done.

Chromography.—Printing with colors.

Chromo-Lithography.—A process of lithographic printing by which one picture is printed from many stones in succession, each stone giving a different color. Ever since the invention of typography and xylography printers have tried to print in colors, but the fact that the forms must be made to register absolutely with each other, although the paper may have contracted or become distorted, has prevented type pages from being used largely in this way, while the blocks, which must necessarily be engraved in duplicate, have forbidden, on the ground of cost alone, the multiplication of engravings by the common press. But in lithography there is an easy method of transfer from one stone to the other, while the further expense of preparation is very slight, as printing by lithography is a chemical process. Senefelder and his immediate followers discovered the advantages which his discovery gave them in colors, and the number of hues used has since been increased, until now thirty or forty are sometimes employed on the same print. Each stone has only a very small part of the engraving, and it is not till the work is nearly done that any eye except that of the designer can see the beauty which will follow. The great bulk of the lithographic work of the present day is chromo-lithographic, as colors are very largely used. See LITHOGRAPHY.

Chromo-Typogravures are made in the same manner that is employed for typogravures, except that several plates are used with different colored inks. Figaro Illustré is embellished with pictures of this kind. There are many variations, known by distinctive names. For further particulars see PROCESS PRINTING.

Church's Press. — A hand-press invented by Dr. William Church of Connecticut, which was exhibited in London in 1821. The pressman had only to lay the sheet upon the tympan and immediately apply his hand to the rounce, by the movement of which the form was inked, the frisket and tympan turned down, the press run in, and the impression given. A reverse of motion completed the process and prepared for the next sheet.

Cifre (Ital.). — Figures or numerals, or arbitrary marks. It is in the singular.

Cilindro (Ital.).—The rollers of a press; also, the revolving cylinder.

Cincinnati.—This city has been for two generations a prominent one in the manufacture of school-books and in printing generally. It was laid out in 1788, but remained a military post for seven years longer. Printing was introduced in 1793, and had increased so rapidly that by 1820 it was thought expedient by Elihu White to send thither a type-foundry, with its tools, to supply the West. The workmen in charge were Oliver and Horace Wells. The Methodists also found that it would be desirable to have a bookmaking establishment there, carrying a full line of their books and doing printing also, and they began operations about 1830. This until recently remained the largest printing-office and bindery of the West. About 1845 railway and steamboat printing became a very important element in the business, and in color-work this city and Buffalo were the centres until after the beginning of the Civil War. It still does considerable work in this way. School-books have been and are still manufactured very largely, and in this neighborhood is the chief paper-manufacturing district of the West. There are now considerably more than a hundred printing-offices in Cincinnati, employing more than a thousand hands. There are two type-foundries and several places where tools and machines for printers are manufactured. The newspapers are numerous and important. There are twelve dailies and seventy-one other periodicals. Playing-cards are manufactured there and much lithographing is done.

Circled Corrections.—Special alterations made by the proof-reader or author are frequently encircled on the proof in order to call particular attention to them.

Circles.—Brass rules in a circular form.

Circuit Edges.—Books, generally Bibles or prayer-books, are sometimes bound with the covers projecting and turned over to protect the edges. Also known as divinity edges and divinity circuit.

Circulars.—The class of small job-work which includes letters, notes, business intimations, &c. The sizes as well as the varieties are numerous. They are most generally sent by mail.

Circulator.—The person who takes charge of the distribution of a newspaper after it is published. He is known also as the city agent.

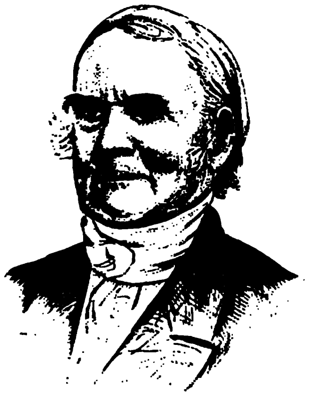
Circumflex.—The accents which in shape resemble a caret, thus: â ê î ô û.

City Editor.—In England, that writer upon a newspaper who reports and discusses the money market; in America, the one who has charge of the reports of events in and around his neighborhood. In large offices he has assistants.

City Printing-Machine.—A single-cylinder machine manufactured in England.

Clarendon.—A kind of type in which all the lines are somewhat thickened. In England some varieties are known as Egyptian. Clarendon differs from full-face as well as from antique, which are the two faces which most nearly resemble it, by having an increase of thickness throughout, but preserving the roundness of contour. It somewhat resembles a crushed letter. In full-face the thick lines are made much heavier, and the thin lines, if thickened at all, are only enlarged to a very moderate degree. In antique the thin lines are thickened, but not the heavy ones, while the squareness of face is preserved and the serifs are made heavy and strong. Clarendon, either in its ordinary width or condensed, is one of the most useful types known.

This line is set in Clarendon.



JOHN C. CLARK.

Clark, John C., a printer of Philadelphia, was born in New York city in 1787. About 1794 he was taken to Philadelphia, and in 1800 went to Washington with William Ross, his step-father, who had been the printer for Congress for many years. In 1803 he was bound apprentice to Robert Carr, a printer, in Philadelphia, and while there set up nearly the whole of Wilson's American Ornithology in great primer type, making the accents with a penknife from a hair-space. In 1817 he formed a copartnership with a friend under the title of Clark & Raser, and soon after printed the first Sunday-school book issued in the United States. In 1831 he removed his office to Dock street, and, opening in connection with it a stationery store, began the sale of commercial and law blank forms. He died on April 22, 1882, in his ninety-fifth year, after spending more than eighty years of his life in the trade. The business is still carried on as John C. Clark & Sons.

Clasp.—The hook or catch used for fastening the covers of some books together.

Claw.—The tail of a sheep's foot.

Claws.—An English name for the catches of stereotype blocks.

Clay.—An earth, largely the oxide of aluminum, used for two purposes in the printing trades. 1. It is used in paper-making for a filling. Interstices are filled up and a better appearance is given to the paper by its use. When submitted to calendering afterwards there is more lustre to its surface than can otherwise be obtained, and it is also far smoother. Clay can be found for this purpose in Silesia and in England, and in South Carolina, Pennsylvania and New York in this country. In some localities in America it can be taken from its beds nearly pure, but the foreign commodity is purified by passing through waterways, the finest particles being carried farthest, the grit, stones and heavy particles being first deposited. The product comes here from Europe in casks, but the American clay is put up in several kinds of packages. The material is mixed with the stuff in the engine. With low grades of paper clay is used as a make-weight, but with high grades it is employed more to improve the finish. See Paper. 2. The clay process in stereotyping is a method by which fine clay is used for the matrix to receive the type instead of gypsum or papier-maché.

Clay & Rosenberg's Typesetting-Machine.—A typesetting-machine brought out in 1842 in London. There was no distributor connected with it.

Claypoole, D. C., a printer of Philadelphia, who was supposed to have been a descendant from Oliver Cromwell, whom he is said to have resembled in appearance. He printed the debates in Congress in his paper from 1783 to 1799. He also published the first edition of Washington's Farewell Address. He died on March 19, 1849, aged ninety-two. The manuscript of the Address, which he had preserved, was many years afterwards sold for upwards of $2,000.

Clean.—Having good proofs. A printer may be the dirtiest man alive, yet in the language of the composing-room he is a "clean" compositor if he sets his type without errors, or with very few errors.

Clean Proof.—A proof containing few errors.

Clean Sheets.—Sheets put aside as printed off to show the progress of work or for editorial purposes.—*Jacobi.*

Clearing Away.—Putting away the reglets, leads, quoins and other things used around a form when the make-up and lock-up are completed. Also, the taking off of the heads, blank lines, notes and other matter which do not constitute the body of a book after a form has been worked off, distributing them and tying up the other matter for future use. This ought to be done with every book, job or newspaper as soon as work has been finished.

Clearing Away Pi.—To separate and distribute broken or mixed type into their proper boxes and cases.

Clearing Out.—Removing the waste paper and paring away any superfluous leather upon the inside of the covers, preparatory to pasting down the end papers in bookbinding.

Clearing the Stone.—After correcting a form it is a rule in all well-ordered offices for the compositor to put away all stray letters and tools into their proper places. A fine is customary in some offices for breaking this rule.—*Jacobi.*

Clerical Errors.—Mistakes in copying or writing manuscript, or in entering, making out or transcribing accounts.

Clerk of the Chapel.—Practically the secretary of a chapel, who collects the subscriptions, &c. An English expression.

Cleveland, a city of Northern Ohio, distinguished for its rapid growth of late. The earliest recorded date for the publication of a newspaper is 1819. There are now issued there nine dailies and fifty-seven other periodicals. There are several lithographic establishments, nearly a hundred printing-offices and one type-foundry, besides machine-shops which manufacture presses.

Cliché (Fr.).—As commonly used at the present day a stereotype, but in the beginning used for that kind of stereotype which was made by plunging the page of type (preferably brass or steel) into the type metal at the moment when that was beginning to solidify. See STEREOTYPING.

Clicher (Fr.).—Originally, to stamp a page or other matter in relief into melted metal just at the moment when it was beginning to grow hard, but now used for stereotyping generally. The word has extended into other languages.

Clicherie (Fr.). — A stereotyping establishment; clicherie au galvano et au plomb, an electrotyping and stereotyping shop.

Clicker.—The compositor in charge of a companionship who receives copy and instructions direct from the overseer or principal, and is responsible to his companions for the charging of the work done. (English.) See COMPANIONSHIP.

Clicking.—The system of working in companionship under a clicker.

Close.—The end of a quotation. The copy-holder calls out "Close" to the proof-reader when he arrives at the end of a quotation.

Close Matter.—Matter without leads and with few break-lines.

Close Spacing.—By this is meant spacing less than a thick space. Works not leaded should be rather more closely spaced than leaded ones.

Closed Apostrophes. — Double apostrophes ("), used to indicate the end of any quoted passage.

Closed Office.—A printing-office closed to society or union hands.

Closed Up.—When a number of compositors are employed upon the same work, the takes being of different sizes and the speed of the men being unlike, there can rarely be a regular succession in emptying. The second compositor may not finish his take till after the third, fourth and fifth have completed theirs. In this case he is keeping the galley or form open, and when he at last finishes it is closed up.

Closet.—In Great Britain, a term which has a twofold meaning. It may mean the management—the proprietor and his chief assistants. It also means the proof-room or reading-closet. In that sense it is often used here.

Cloth.—A prepared muslin, employed for covering the boards and back of a book. Cloth bindings, with no attempt at ornamentation, were occasionally made for many years, but systematic use on a large scale does not date back much further than 1830. This mode of binding is done mostly by the aid of machinery. The covers are generally stamped in an ornamental manner by means of brass stamps. There are many different patterns and colors of cloth.

Cloth Boards.—Books, when bound in cloth cases, are described as being in cloth boards.

Cloth-Faced Paper. — Paper and cloth or linen pasted together, used specially for folding cards to prevent them from breaking.

Clothing Rollers.—Changing the composition on worn-out rollers. (English.)

Clumps.—Slugs used by printers in any department of their business, or pieces of metal used by stereotypers to form the bevel of a plate. This word is unknown in America, but is used in England.

Clymer, George, the inventor of the Clymer press, generally regarded to this day as the best that has appeared upon the other side of the Atlantic, was born in Bucks County, Pa., of a Swiss family which left Geneva and settled in that colony long before the Revolution. The date of his birth was 1754. Clymer's father was a farmer, and he was brought up to the same occupation till about sixteen, when he began the construction of a new kind of plow, which proved to be far superior to anything previously known. His subsequent labors were in carpentry and joining, in which he was very successful. When the first bridge was made across the Schuylkill coffer-dams were sunk for the piers, but the ordinary pumps proved ineffectual. Clymer devised a new one, which had so much power that it discharged five hundred gallons a minute, together with sand, gravel and stones. He obtained for this a patent both in England and America. He next attempted to improve the printing-press, then of wood. In this he was partially successful, but he was more so in respect to iron presses. His was entitled the Columbian. When finished he took it to England, as printers in America were generally unable to pay $400 for one, which was the price charged. It produced an immediate sensation in England, both on account of the work it did and the novel and ornamental way it was constructed. Hansard says that "if the merits of a machine were to be appreciated wholly by its ornamental appearance, certainly no other press could enter into competition with the Columbian. No British-made machinery was ever so lavishly embellished. We have a somewhat highly-sounding title to begin with; and then, which way soever our eyes are turned, from head to foot, or foot to head, some extraordinary features present themselves. On each pillar of the staple a caduceus of the universal messenger, Hermes; alligators and other draconic serpents emblematize on the levers the power of wisdom; then, for the balance of power (we rude barbarians of the Old World make mere cast-iron lumps serve to enforce our notions of the balance of power), we see surmounting the Columbian press the American eagle with extended wings and grasping in his talons Jove's thunderbolts, combined with the olive branch of Peace and cornucopia of Plenty, all handsomely bronzed and gilt, resisting and bearing down all other power!" See COLUMBIAN PRESS.

Mr. Clymer received for this invention a gold medal of the value of one hundred ducats from the King of the Netherlands, and a valuable present from the Emperor of Russia. The Netherlandish medal had on one side a correct likeness of the king, beautifully executed, surrounded with:

WILH. NASS. BELG. REX. LUXEMB. M. DUX.

On the other side was the inscription given below, surrounded with a wreath of most exquisite workmanship.

The press was square in frame, instead of bowing out like the Stanhope. Each side was mounted upon two legs. The bed was held up similarly to the Stanhope. The bar acted upon a fulcrum at the near side of the press, which brought down by action through another lever the arm over the top, which was singularly substantial. It was very favorably received, particularly by the journeymen. Mr. Clymer died in London at the age of eighty on August 27, 1834. His wife was Margaret Backhouse, daughter of Judge

GEORGIO
CLYMERO
VIRO SOLERTISSIMO
PRO OBLATO
PRELO TYPOGRAPHICO
SINGULARE ARTE
CONFECTO
REX
DEDIT
MDCCCXIX

Backhouse, of Durham Iron Works, in Pennsylvania. Three daughters survived him, one of whom married Alexander Renfrew Shaw, who continued the business.

Co.—An abbreviation of the word colon, used in the reading department in English offices.

Cobb Paper.—A paper largely used by bookbinders for the sides of half-bound books. It is made in various shades of color.

Cock.—In throwing or "jeffing" with quadrats as dice, when one lodges on top of another—thus lifting it partly off the surface thrown on—it is thus termed. Another throw is then allowed. See JEFFING.

Cock-Robin Shop.—A small printing-office where common work is done and labor is badly paid for is generally thus described in London, and the usage is extending to this side.

Cock-Up Letter.—Where a letter of a size or two larger than that in the body of a work is used at its beginning or at the beginning of a chapter, and justified in so that the bottom of each shall line, it is called a cock-up letter.

THIS is a Cock-Up Letter.

Cocks.—The centre pieces of a brace are thus called by Ringwalt. The end pieces are hens.

Coda (Ital.).—The last page of a part or of a section of a book.

Codex.—Before paper was invented wooden tablets, made of the inner bark of a tree, were written upon, and these tablets were called codices. The word codex thus eventually came to mean writings or a book or a collection of laws, and was finally modernized from the latter into the word code.

Codex Argenteus.—A book retained in the University of Upsala, in Sweden, which is the only fragment of a language, the elder brother of German, Dutch and English, that now exists. It is a translation of the Scriptures, with the exception of the Book of Kings, into Mœso-Gothic about the year 360, and was made by a bishop named Ulphilas. The book is upon vellum of a violet color, and each letter, instead of being written, was either painted in silver or the characters were stamped upon the vellum with a hot iron after the manner used by bookbinders. The work obtained its name from the silvery appearance of the letters.

Coffin.—1. In a wooden hand-press the framework of the bed into which the stone that in old times was used for the table on which to place the form was embedded. 2. A little conical bag made of paper to put sorts in—similar to those used by grocers for sugar, &c.

Cogger Hand-Press.—An iron hand-press, with wrought-iron cheeks or perpendicular pillars, low head and compound lever beneath it, invented by J. Cogger. This compound lever draws its end about one-quarter round a collar into which are fitted two studs of case-hardened iron with convex faces, which, when put into motion by the lever, move up inclined planes of different degrees of inclination, so that when the platen is first put into the descending motion towards the form, and power is less requisite than velocity, the latter is very rapid; but as the platen arrives towards the point of pressure the velocity is diminished to increase the power, until arriving nearly on a plane the power is almost infinite.

Coin (Fr.).—A quoin; coin mécanique, a mechanical quoin.

Cold-Pressed Paper has a hard and rough surface and is very thick for its weight, receiving no calendering whatever. It is made in many sizes. The larger sizes are known as drawing-paper. It is a difficult paper to write or print upon.

Cold Pressing.—The pressure applied to sheets after being printed, either in the screw press or hydraulic press. It takes out the indentations and gives a slight gloss.

Cold Rolling.—In contradistinction to hot rolling—the rollers being made hot in the one instance, and in the other being in the natural state.

Colden, Cadwallader, a physician from Scotland, who came to America in early life, attained political eminence, was acting governor of New York from 1760 till his death, wrote a History of the Five Nations and was the leading scientific man of the colonies. He was the author of a system of stereotyping, which he communicated to Dr. Franklin, asking the opinion of the great philosopher upon his methods. This was in 1743. He was born at Dunse, Scotland, on February 17, 1688, and died on Long Island, N. Y., on September 28, 1776.

Colenso, William, the first New Zealand printer, began work there in 1834. He was sent out by the Church Missionary Society, with an outfit, which did not include paper. Some was, however, found in possession of the missionaries, and on February 17, 1835, twenty-five copies of St. Paul's Epistles to the Philippians and Ephesians were printed. On May 19, 1836, the first book in English was brought out. Mr. Colenso was still living in 1889.

Colla Forte (Ital.).—Strong glue.

Collating.—Examination of the sheets of a book after they have been gathered to see whether they are all there and whether they follow in regular order. It is done very rapidly by experts. Formerly the person who collated took a heap of a gathering and placed the first or signature page uppermost towards his right hand, and with the point of a short bodkin or a penknife picked up the corner of each sheet, in order to see that each signature was right, passing his thumb under them as they were lifted, to keep what he examined separate from the heap, and thus proceeded till he had examined one gathering; he then slipped this gathering a little back upon the heap, and proceeded with another, till he had gone through eight or ten. He thus proceeded until he had collated a sufficient number for the work. The sheets then used were small, but when they became large it was impossible to follow this plan. They were then collated when folded, the collator having a rubber ring or thimble to assist him in raising the sheets. On magazines of late it has been customary to mark a diagonal band on the back of each signature, the one on signature A lapping on signature B, and that one on C. If the diagonal band is perfect the magazine is perfect; but if there is a break in it a sheet is either redundant or lacking.

Colle (Fr.).—Size, in paper-making; sans colle, unsized paper.

Coller le Tympan (Fr.).—To cover the tympan.

Collins, Isaac, a printer of New Jersey and New York, was born in Delaware in 1746. He began his apprenticeship with James Adams at Wilmington, Del., finishing it with William Rind at Williamsburg, Va. He then went to Philadelphia, where, for his extraordinary diligence, he received 25 per cent. more than other journeymen. He began business at Burlington, N. J., in 1770, and in 1777 began a newspaper. He afterwards removed to Trenton, and there prosecuted his business for a number of years. He was printer to the State, and at Trenton he printed a handsome and very correct quarto edition of the Bible. The proof was read eleven times, the last time by his daughter, who was a very skillful reader. He removed to New York about 1795, and continued there in business for ten years, then retiring. His sons were partners in the firms of B. & J. Collins, stereotypers, and Collins & Hannay, publishers, and sons and grandsons continued business in New York till about 1880. Isaac Collins was a Quaker, and derived much assistance from persons of that persuasion. He died in Burlington, N. J., in March, 1817.

Collins, Samuel C., a type-founder of Philadelphia, died suddenly on July 13, 1883, in the fifty-fourth year of his age. He had been connected with the firm of which he was an active partner, Collins & McLeester, since 1853, and was a city councilman from 1875 till his death.

T. K. COLLINS.

Collins, Tillinghast King, was born in Philadelphia on October 14, 1802, and died there in April, 1870. At thirteen he was apprenticed to Mathew Carey, but finished his time with James Maxwell. In 1833, having then wrought as a journeyman for some time, he united with Robert Wright in opening a printing-office with only one hand-press. About two years after Mr. Collins formed a partnership with his own younger brother under the firm-name of T. K. & P. G. Collins. The firm speedily became noted for the accuracy and beauty of its output, publishing many illustrated works for the national government. P. G. Collins died in 1854, and in 1858 Mr. T. K. Collins was attacked by paralysis, and his business from that time was carried on without his active participation in its labors, although his counsel was still valuable. He paid much attention to the practical part of the business, and the patent roller-boy for hand-presses and the movable rules which surround the blocks on which certain stereotype plates are placed are due to his inventive talents.

Collotypes.—This is a method of preparing a process plate by gelatine, in its basis like the albertype or heliotype. Albert, Bierstadt, Frisch and others have succeeded in producing very beautiful pictures in colors by preparing several gelatine plates, each plate bearing particular parts of the picture and being used for printing the appropriate colored ink. As many as seven different plates are employed successively in producing the picture. There are different methods in use for preparing the several plates. One plan is to make a separate negative for each color. This is accomplished by interposing a suitable screen of colored glass or colored liquid between the object and the photographic plate in the camera. For example, a screen which shuts out all colors except blue will permit only the blue portions of the picture to be photographed on the negative, and a gelatine plate from this negative may be used for printing with blue ink. In a similar way another screen will furnish a negative and plate for the red portions of the picture, and so on. Another plan is to prepare the gelatine plates from one and the same negative by stopping out all of the picture except that of one color.

Colombier.—A drawing-paper, size 34½ by 23½ inches.

Colon.—A mark of punctuation. It is chiefly used to indicate that the sentence, so far complete, is to be followed by some other word or words. See PUNCTUATION.

Colonna (Ital.).—A column.

Colonne (Fr.).—Column.

Colophon.—An inscription or tail-piece—usually a printer's imprint—at the end of a book. In the earliest ages of printing this was the commonest method of denoting the printer and place of printing, but it went out of use entirely in the last century.

Color.—1. It has not been until late years that printers have turned their attention to colors. Rubricated letters appear in the very earliest typographic work, and red lines are also found soon after; but with these exceptions we meet with very little color-printing till we come to work done forty years ago. The books on typography of the early part of the century lay down rules for the manufacture of colored inks, but little use seems to have been made of them by the ink-makers till within the memory of men who are still in active business life. Lottery bills in 1825 were often printed with red lines; red, green and blue inks came into use in printing circus posters shortly after 1840, and by 1848 theatres had attempted to utilize colored inks. The most elaborate work of this kind done in America up to 1852 was a bill of the Sea of Ice, executed in New Orleans at about that time. The colors were represented by different inks and the ice by a silver frosting, executed with dusting colors. Copies of this bill were hung up in printing-offices for many years to show to what an extreme the art could be carried. The railroads about 1850 began also to use colored inks largely, and they were imitated in this by State and county fairs in their display bills. When the war began printing in colors was common, and some of it was very good, although the varieties were limited. The best examples up to that time and for some considerable space afterwards came from Europe, and were found in the books issued by the Imperial and Royal Printing-Office at Vienna and the Imperial Printing-Office at Paris, with the Album of Charles Derriey of the latter city. The register in all these was good; the colors were well chosen, and pains were taken to work the sheets slowly on very good paper. Later there was a wonderful development of this branch of printing, chiefly in America and in Germany, the latter excelling in harmony and smoothness, while the former brought out new, bold and striking lines.

The art of the color-printer is necessarily very different from that of the painter in oils, or even from the lithographer. A lithograph is really a drawing on stone mechanically repeated. The letter-press printer, on the contrary, must deal with inflexible types and brass rules, quadrangular in shape and very small in size. He can set a single line in two or three minutes, if it is straight, but to curve it and then fit it into an appropriate place so that it will lift may take him fifteen minutes. Common black ink is worth twenty, thirty or forty cents a pound, and some kinds can be bought for ten. But colored inks vary from a dollar to twenty dollars or more a pound, the dollar red not being as good as the thirty-cent black. More of it, too, must be used. As no office keeps going constantly on colored work, there is often a great waste when the press is started and when it is cleaned up, and to print a job of two or three thousand in two colors will take three or four times as long as to do it in one color. These and other reasons have prompted many printers to decline executing work in any other color than black, as the results are frequently unsatisfactory, the charges are high, but do not yield much profit, and it is hard to induce workmen to take the necessary care. The register must be exact, yet the drying of the first ink frequently distorts the sheet. Letter-press printers at the present day rarely attempt to print engravings in their appropriate colors, as the proper result cannot be reached. Lithography does this better and more cheaply. Yet the printing of books or of engravings in monochrome, by which is to be understood some other color than black, or of engravings in different colors on different pages, is now widely extended, and seems a very happy innovation. Sometimes, too, these are printed over a tint back which is very fine and light, thus giving more color to the whole engraving and preventing large masses of white from showing as such. This process also deepens the blacks.

Colorists use certain terms to indicate differences in color or intensity, and their usage is to a considerable extent followed. Tones are degrees of intensity, tints are admixtures with white, hues are admixtures with other colors, and shades are admixtures with black. In practice, however, most persons use these terms indiscriminately.

The colors commonly esteemed to be such by a printer are red, yellow and blue, the primary ones; green, orange and purple, the secondary; black the absence of colors, and white the sum of them. His view is not that of the optician or the scientist; he takes the word color in its ordinary signification. Each of these hues modifies the other. White with black makes gray; red or yellow with black makes brown, and cream color is yellow and white. Each color, again, can be thinned with varnish, so that the coloring matter is reduced to the smallest proportions. The colors in nature are infinitely varied. There are many colors of green in vegetation, of brown in stones, of blue in the sky. The object which close by you is glaring and repulsive a couple of hundred yards away lends an interest to the landscape, and the bright-red barn which near at hand is felt to be an abominable thing at the distance of a mile becomes a desirable bit of color for an artist. All colors are modified by light and by distance. The air is not perfectly transparent, but has a blue tinge, very plainly to be seen in looking at something four or five miles off, and a rock does not seem the same in the blaze of noon that it did in the morning of a dull day. He who attempts to become a successful color-printer must study painting, for it works with the pigments he also uses, but differently prepared, and it shows him the way to obtain both contrast and harmony. He must have a bold contrast much more frequently than a painter, for what he does is generally something to which attention must be called. It must catch the eye as well as please it, and it must be distinct. It is, therefore, necessary for him to mix his colors in such a way that he can record them for future use. The ink-makers will imitate or manufacture any color that he may desire, but when they have once made the desired compound they have the formula and the printer is not alone in the possession of his particular hue. The colors which are known as standards no printer can hope to improve upon. Every ink-maker in this country who devotes attention to this work produces meritorious results, yet the printer ought not to be satisfied with what he thus obtains. They afford nothing distinctive for his office, but are the common property of all printers. A few new tints will give his color-work a flavor all its own, not divided with anyone else.

The number of colors ordinarily on hand at an ink-house is forty or fifty, but the colors to be recognized by a good eye go far beyond a thousand. A newspaper is white; so is a piece of bleached muslin, a field of snow, a white house or a pail of milk. But place the muslin and the newspaper on the snow against the house and compare all of them with the milk. No one is like any of the others. The snow is the color in its greatest purity, and the milk is tinged with blue, while the house has a tint of gray. Yet the quantity of blue in the milk is probably not much over one in a hundred, and of black in the white of the house not so much. It is by taking very small quantities of one color and mixing with comparatively equal proportions of two others that brilliant effects are frequently produced. A brilliant brown can be produced with a large proportion of red, a smaller one of yellow, and a still smaller one of black. To know what can thus be done it is necessary for the pressman or designer to test different proportions and note the result. Let him, for instance, experiment with black, white and red. One part of white with nine parts of red takes off the brilliancy of that color, while it will dull the black. But if five parts of white are put with five parts of red it still remains a decided red, weak in contrast with other brilliant colors, but still a red. It even retains a faint blush color when nine parts of white are mixed with one part of red. Let the white be mixed in equal quantities with black and the result will be a very undesirable one; it will be a dirty gray. It is not till the black is reduced to one or two parts that a good gray is reached. Now add a little red and the effect is magical. The faint reddish tint it had when mixed with white alone has been altered into a color much stronger than anyone could have predicted without previous knowledge. The number of colors that can thus be made out of three colors, rising on the scale of ten, is a thousand, while with four colors it is ten thousand. But the work from which it is possible to exclude white is more brilliant than when it is used. Red and yellow are the two brilliant colors; blue the cool one. The five colors mentioned, combined on the scale of ten, will make a hundred thousand different tints. In printing it is a rule to place the weak, mild colors in the background, while the vivid ones are used for the principal lines. It is a mistake to use many bright lines together; they look better with a contrast. In an octavo title-page two or three lines of red are enough; if more than four are used the page does not appear well.

In a rough way the ordinary shades can be said to be thus compounded of the other colors:

Brown is made with red and black; bright brown of carmine, yellow and black; rose of lake and white; chestnut of white and brown; purple of carmine and blue; lead color of white, blue and black; pearl of white, blue and lead color; pink of white and carmine; chocolate of black and Venetian red; French white of purple and white; green of blue and yellow; pea green of green and white; dark green of green and black; orange of red and yellow; straw color of white and yellow; flesh color of white, lake and vermilion; olive of red, blue, black and yellow; buff of yellow, white and red; vermilion of carmine and yellow; lavender of carmine, ultramarine and white; sky-blue of white and ultramarine; umber of white, yellow, red and black; drab of umber, white and Venetian red.

As a rule the brightest and lightest color, if it is designed to lap over or cover another color, should be printed last, and designs should be thus made. Thus in printing the three primaries the true method is to put on the blue, then the red and then the yellow.

The painters' books give long lists of colors. Some are formed from minerals, as vermilion, emerald green, cadmium yellow, &c.; others from vegetables, as indigo, madder lakes, brown pink, &c.; others from insects, as carmine, &c., and still others from earths, as terre verte, ochres, sienna, umber, &c. Nearly all colors known can be used in printing-ink, which is in reality a kind of paint, consisting of a pigment and a varnish. Besides the modification derived from blending one color with another, a different treatment can be made by mixing with varnish, which is printing-ink with the coloring left out. If a pound of black ink will print five hundred sheets of a certain size, it will, by the addition of two pounds of varnish, print fifteen hundred, but the color will be very faint throughout the whole. Varnish is best used when mixed in large proportions with ink for tints and large kinds of type that are to have other kinds of type printed over them. Mercurial inks are affected injuriously by copper. The following are the names of the most commonly used inks, not as they appear in the books of the ink-makers, where they are frequently given fanciful appellations, but as they are entitled by painters:

FUGITIVE COLORS.

Yellow.—Yellow lake, Dutch, English and Italian pink, yellow orpiment, king's yellow, gamboge, gallstone, Indian yellow, queen's yellow and patent yellow.

Red.—Rose pink, carmine, Florence, Hamburg and kermes lake, iodine scarlet and dragon's blood.

Blue.—Indigo, intense blue, Antwerp blue, Prussian royal.

Orange.—Orpiment, golden sulphur of antimony, annato.

Green.—Sap, verdigris.

Purple.—Lake, burnt carmine, lac lake.

Brown.—Pink, light bone brown, prussiate of copper.

PERMANENT COLORS.

White.—Common white lead, flake, crems, Venetian, barytic, tin, blanc d'argent.

Yellow.—Terra di Sienna, jaune, chrome, Naples, yellow ochres, lemon, Oxford, Roman cadmium.

Red.—Lac lake, red lead, chrome, vermilion, madder lakes, madder carmines, light red, Venetian, Indian, scarlet.

Black.—Ivory, lamp, Frankfort, mineral, blue-black, black chalk.

Blue.—Verditer, sanders, cobalt, ultramarine, blue ochre, smalt.

Orange.—Lead, chrome, vermilion, ochres, jaune de mars, burnt sienna earth, burnt Roman ochre.

Green.—Emerald, verditer, common chrome, mineral, terre verte, cobalt.

Purple.—Cold madder, purple ochre.

Brown.—Vandyke, Rubens, raw umber, maroon lake, Antwerp, asphalt, sepia, manganese brown, bistre, Cassel earth.

The three primary colors may be used together in printing when the object is to have a strong contrast. But the primaries should not be used with the complementary colors next to them, as blue and green, yellow and green, blue and purple, red and purple, red and orange, yellow and orange. These contrasts are not found to be pleasing. If, however, they are used together, the hues should incline towards the next colors. Thus an orange yellow and a bluish green will look much better together than if the type for each color were used. The reds and yellows are known as luminous colors, while blue and the duller greens and purples are non-luminous. Some of the former should always be used in printing, unless the job is a monochrome. Printing should not be executed of one color upon its complementary, as it produces a very dull impression. Thus orange ink upon blue paper will be certain to look badly. Green and red are complementary, blue and orange, violet and greenish yellow, and indigo and orange yellow. Printed upon colored papers inks change in appearance, and to a certain extent their complementaries change with them. Black ink upon red paper has a tinge of green; on orange a black with bluish tint; upon yellow with a violet hue; upon blue orange gray; upon green reddish gray, and upon violet greenish gray.

A theory of colors can be obtained by the printer from a combination of the three primary colors. The best contrast with one color, which brings it out the best, is the combination of the other two. Thus red is best contrasted by a combination of blue and yellow; blue by a combination of yellow and red, and yellow by a combination of red and blue. The same rule holds good as to combinations. Each color takes a certain number of the rays of light, which if all were united would produce white. The remainder of the rays of light, if commingled, would form a color which would be the harmonious contrast with what had first been abstracted. This rule holds good throughout the entire range of hues. Take any color and find of what it is composed, and its complementary color can be found by knowing what is farthest away from it. But it must be noticed that it is the pure colors, and not the colors of pigments, which must be considered. The latter too frequently make bad mixtures. When any color and its complement are added together the result approximates to a black. With pure rays of light the addition would make white; but with pigments its reverse.

The following are the combinations which are useful and attractive, as given in Noble's Color-Printing:

Combination of color in two workings on white ground: Bright green and vermilion red, bright green and carmine, bright green and purple, bright green and warm brown, bright green and orange, ultramarine and carmine, ultramarine and maroon, ultramarine and warm brown, light blue and bright orange, purple lake and bright yellow, crimson and bright yellow.

Combinations in two colors upon pale-yellow grounds which incline more to lemon than to orange: Yellow green and carmine, yellow green and maroon, sage green and maroon, sage green and carmine, bright green and red brown, bronze color and carmine, bronze color and purple.

Combinations in two colors upon pale-yellow grounds which incline more to orange than to lemon: Bright pale ultra and orange, bright blue green and orange, bright blue green and carmine, bright ultra and carmine, bright ultra and maroon, bright green and maroon, bright ultra and bronze color, bright ultra and red brown, bright ultra and red purple, bright purple and orange, bright purple and carmine.

Combinations in two colors upon pale-purple grounds: Red purple and ultra, red purple and blue green, blue purple and crimson, ultramarine and carmine.

Combinations in two colors upon pale-green grounds of a bluish tone: Ultramarine and carmine, ultramarine and red purple, deep blue green and red purple, deep blue green and carmine, deep blue green and maroon.

Combinations in two colors upon pale-blue grounds: Deep ultra and red purple, deep ultra and carmine, deep blue green and carmine, bright green and red purple, bright blue and red purple.

Combinations in two colors upon pale-green grounds inclining to yellow: Bright green and carmine, bright green and purple, bright green and red brown, bright green and maroon, sage green and either of the above.

Combinations upon pale-green grounds which have been toned with brown, i. e., sage green: Deep sage green and carmine, deep sage green and red purple, deep sage green and maroon.

Combinations in two colors upon pale-pink grounds: Carmine and bright ultramarine, carmine and bright green, carmine and blue purple, carmine and bronze color, purple and bronze color, light ultra and bronze color, red purple and yellow green.

Combinations in two colors upon deep-buff grounds: Maroon and deep blue green, maroon and deep ultra, deep purple brown and carmine, deep blue purple and carmine.

Combinations in two colors upon light-brown grounds: Carmine and deep purple, carmine and deep green, carmine and black, maroon and deep green, red purple and deep green, deep brown and deep green, deep brown and black.

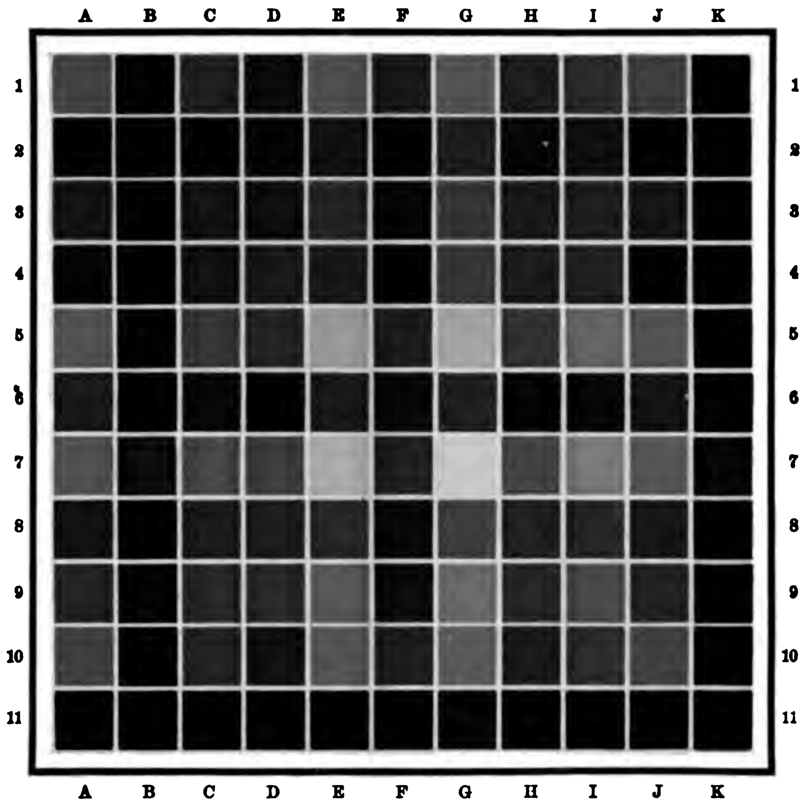
Combinations in two colors upon green grounds of medium strength: Deep green and deep purple, deep green and maroon, deep green and carmine, black and carmine.

In printing with black it is found that a job sometimes looks wrong because it has too irregular an outline or there are too great hollows in its interior. This may frequently be corrected by using a rule around it. So in colors. Two colors may make each other appear dull, where the introduction of black to divide them will add brilliancy to each. Thus chocolate and brick color cannot be made to look well together. But let a black line of some weight divide them and they will look passably well. Add a scarlet line and the lack of harmony in the background will be forgotten. It should be noted that two tones, or degrees of strength of the same color, or two varieties look well together, care being taken to let the brightest or most intense hue have the most prominent position, but with less surface than the other part. The use of yellow in its brighter hues is generally unsuccessful in lines of printing-type. The letters do not produce enough impression on the eye. In small work this is largely avoided by the use of gold, which has the intensity as well as the color.

Two methods are known to printers for working colored jobs. One is in mixing the inks so that the proper color is on the rollers and is by them applied to the type; a second is to print one color over another. Both methods are generally joined when three or more colors are used, the upper color being much modified by that below it. Thus black over red is a dark brown, while red over black is a warm brown. With two colors a third can be made, and with three colors six additional ones. All of these may not prove available, but the most will. It should be noted that a second impression should never be taken until the first is dry, otherwise some will set off and mix with the ink on the rollers. The other plan is most common in one and two color work. There is in this a greater richness and brilliancy, and these are very important things for the printer to regard. In any elaborate work there is a certain stiffness about the colors as obtained from the ink manufacturers, and what they make for A they make also for B. Neither can have any peculiar inks. Yet nothing gives an air of individuality more than this. Blacks in which there is a dash of blue, crimsons made bright with a little scarlet, reddish browns in which a little yellow has been incorporated, are examples of the easier mixtures. But there are thousands of tints which nature affords which can be yielded up to the workman who experiments, note-book in hand. A porcelain lamp may have a number of colors not known in printing-

COLOR DIAGRAM.

In this diagram, which has been specially designed and printed for the AMERICAN DICTIONARY OF PRINTING AND BOOKMAKING, are shown eleven colors crossing the same eleven. The bars were first printed perpendicularly, and then across the page. The line from the upper left-hand corner diagonally down to the lower right-hand corner is where the first printed color is crossed by the same color, and therefore represents each in its purity. In some cases the name relating to a certain square must be considered only as approximate, distinct appellations not being known among painters or printers, and the same name is sometimes duplicated, as the color is duplicated, or substantially so, although an acute eye may discover slight differences.



A 1—Scarlet: over itself.
A 2—Chocolate: Dark Green over Scarlet.
A 3—Lake: Magenta over Scarlet.
A 4—Light Plum: Ultramarine over Scarlet.
A 5—Orange: Lemon Yellow over Scarlet.
A 6—Carmine: Crimson over Scarlet.
A 7—Deep Salmon: White over Scarlet.
A 8—Dark Magenta: Violet over Scarlet.
A 9—Cinnamon: Medium Green over Scarlet.
A 10—Vermilion: Deep Orange over Scarlet.
A 11—Blackish Purple: Prussian Blue over Scarlet.

B 1—Blackish Brown: Scarlet over Dark Green.
B 2—Dark Green: over itself.
B 3—Blackish Green: Magenta over Dark Green.
B 4—Antwerp Blue: Ultramarine over Dark Green.
B 5—Grass Green: Lemon Yellow over Dark Green.
B 6—Seal Brown: Crimson over Dark Green.
B 7—Bremen Blue: White over Dark Green.
B 8—Dark Antwerp Blue: Violet over Dark Green.
B 9—Leaf Green: Medium Green over Dark Green.
B 10—Deep Olive: Deep Orange over Dark Green.
B 11—Peacock Blue: Prussian Blue over Dark Green.

C 1—Lake: Scarlet over Magenta.
C 2—Neutral Brown: Dark Green over Magenta.
C 3—Magenta: over itself.
C 4—Violet: Ultramarine over Magenta.
C 5—Bright Brown: Lemon Yellow over Magenta.
C 6—Munich Lake: Crimson over Magenta.
C 7—Pink Lilac: White over Magenta.
C 8—Mauve: Violet over Magenta.
C 9—Light Drab: Medium Green over Magenta.
C 10—Turkey Red: Deep Orange over Magenta.
C 11—Navy Blue: Prussian Blue over Magenta.

D 1—Purple Slate: Scarlet over Ultramarine.
D 2—Antwerp Blue: Dark Green over Ultramarine.
D 3—Purple: Magenta over Ultramarine.
D 4—Ultramarine Blue: over itself.
D 5—Sap Green: Lemon Yellow over Ultramarine.
D 6—Plum: Crimson over Ultramarine.
D 7—Army Blue: White over Ultramarine.
D 8—Blue Gentian: Violet over Ultramarine.
D 9—Light Leaf Green: Medium Green over Ultramarine.
D 10—Burnt Umber: Deep Orange over Ultramarine.
D 11—Deep Ultramarine: Prussian Blue over Ultramarine.

E 1—Dark Orange: Scarlet over Lemon Yellow.
E 2—Moss Green: Dark Green over Lemon Yellow.
E 3—Burnt Sienna: Magenta over Lemon Yellow.
E 4—Ivy Green: Ultramarine over Lemon Yellow.
E 5—Lemon Yellow: over itself.
E 6—Reddish Bronze: Crimson over Lemon Yellow.
E 7—Golden Yellow: White over Lemon Yellow.
E 8—Light Olive: Violet over Lemon Yellow.
E 9—Medium Emerald: Medium Green over Lemon Yellow.
E 10—Orange: Deep Orange over Lemon Yellow.
E 11—Sage Green: Prussian Blue over Lemon Yellow.

F 1—Carmine: Scarlet over Crimson.
F 2—Seal Brown: Dark Green over Crimson.
F 3—Munich Lake: Magenta over Crimson.
F 4—Plum: Ultramarine over Crimson.
F 5—Blood Orange: Lemon Yellow over Crimson.
F 6—Crimson: over itself.
F 7—Geranium Lake: White over Crimson.
F 8—Garnet: Violet over Crimson.
F 9—Maroon Brown: Medium Green over Crimson.
F 10—Pomegranate: Deep Orange over Crimson.
F 11—Dark Purple: Prussian Blue over Crimson.

G 1—Salmon: Scarlet over White.
G 2—Bremen Blue: Dark Green over White.
G 3—Lilac: Magenta over White.
G 4—Army Blue: Ultramarine over White.
G 5—Canary Yellow: Lemon Yellow over White.
G 6—Crushed Strawberry: Crimson over White.
G 7—White: over itself.
G 8—Light Violet: Violet over White.
G 9—Nile Green: Medium Green over White.
G 10—Light Persian Orange: Deep Orange over White.
G 11—Deep Cobalt: Prussian Blue over White.

H 1—Red Purple: Scarlet over Violet.
H 2—Dark Antwerp Blue: Dark Green over Violet.
H 3—Mauve: Magenta over Violet.
H 4—Lake Blue: Ultramarine over Violet.
H 5—Gray Brown: Lemon Yellow over Violet.
H 6—Garnet: Crimson over Violet.
H 7—Light Violet: White over Violet.
H 8—Violet: over itself.
H 9—Purple Gray: Medium Green over Violet.
H 10—Deep Reddish Brown: Deep Orange over Violet.
H 11—Navy Blue: Prussian Blue over Violet.

I 1—Cinnamon Brown: Scarlet over Medium Green.
I 2—Leaf Green: Dark Green over Medium Green.
I 3—Lilac Brown: Magenta over Medium Green.
I 4—Mineral Blue: Ultramarine over Medium Green.
I 5—Light Emerald: Lemon Yellow over Medium Green.
I 6—Deep Reddish Brown: Crimson over Medium Green.
I 7—Nile Green: White over Medium Green.
I 8—Purple Gray: Violet over Medium Green.
I 9—Medium Green: over itself.
I 10—Golden Brown: Deep Orange over Medium Green.
I 11—Deep Greenish Blue: Prussian Blue over Medium Green.

J 1—Vermilion: Scarlet over Deep Orange.
J 2—Deep Olive: Dark Green over Deep Orange.
J 3—Vienna Lake: Magenta over Deep Orange.
J 4—Burnt Umber: Ultramarine over Deep Orange.
J 5—Orange: Lemon Yellow over Deep Orange.
J 6—Carmine: Crimson over Deep Orange.
J 7—Persian Orange: White over Deep Orange.
J 8—Deep Reddish Brown: Violet over Deep Orange.
J 9—Golden Brown: Medium Green over Deep Orange.
J 10—Deep Orange: over itself.
J 11—Olive Black: Prussian Blue over Deep Orange.

K 1—Blackish Purple: Scarlet over Prussian Blue.
K 2—Deep Greenish Blue: Dark Green over Prussian Blue.
K 3—Navy Blue: Magenta over Prussian Blue.
K 4—Deep Ultramarine: Ultramarine over Prussian Blue.
K 5—Deep Sage Green: Lemon Yellow over Prussian Blue.
K 6—Blackish Purple: Crimson over Prussian Blue.
K 7—Deep Blue: White over Prussian Blue.
K 8—Navy Blue: Violet over Prussian Blue.
K 9—Dark Antwerp Blue: Medium Green over Prussian Blue.
K 10—Olive Black: Deep Orange over Prussian Blue.
K 11—Prussian Blue: over itself.

inks, but which it is possible to imitate. One is a chrome yellow, darkened over by smoke; a second is the hue seen in a sunset when the last rays of light are ending, a dull purplish gray, soon to change to black; and a third is a mixture of violet and gray, such as some wild-flowers have in the spring. A fourth color is that which the flesh of some oranges shows, perhaps a crimson, but certainly not an ordinary crimson. These can and should be imitated.

Sometimes it will be found that an appropriate color has been determined upon, but that enough cannot be left on the type or tint-block to get the proper effect. Yellows suffer very much from this defect. This can be counteracted by putting the sheet through the press a second or even a third time. It is just like painting a house. No painter can put on the color he desires by once painting, but he finds it necessary to repeat the work with his brush.

In the diagram printed herewith there are eleven colors, crossed by the same eleven. It will be seen where the other colors cross the white they are lightened or else preserve their original brightness; but where the light ones are crossed by the dark ones they are all dulled.

The diagonal line leading from the top at the left shows the colors in their purity, being scarlet, dark green, magenta, ultramarine blue, lemon yellow, crimson, white, violet, medium green, deep orange and Prussian blue. The horizontal lines were printed first, the perpendicular ones being printed over them. Most of the colors on one side of the diagonal line are repeated with a slight difference on the other side, K 1 being nearly matched by A 11, J 1 resembling A 10 and I 1 being almost identical with A 9. There are in all over one hundred colors, those repeated so exactly that no difference can be found being very few. The colors thus arising are, too, very different from what might have been guessed before. Russet is a yellow over a purple, chocolate a red over a green, and sepia an orange over a medium green. A good method of testing the eye in colors is to take the various greens of the diagram, beginning at the lightest, and making a descent through all the other greens till the dullest is reached; then to take the reds, oranges and blues and follow the same plan.

For the use of artists color-men publish diagrams of color. The only two works of any size upon color-printing are those of Noble, which was brought out in London about 1880, and Earhart of Cincinnati, now about to appear. Further information will be found under INK, PRESS, PRESSWORK, PRINTING and VARNISH.

2. Quantity of ink upon the rollers or the form. The pressman calls out for color when he needs more ink.

Color-Printing.—Printing in other colors than black. See COLOR and PRESSWORK.

Colorado.—Printing has been carried on in this State since about 1858. Denver is the principal town, with Leadville as second. In 1890 there were published in Colorado twenty-seven daily papers and 241 other periodicals. The new Home for Printers will be at Colorado Springs, in this State. It is partly endowed by funds derived from George W. Childs and Anthony Drexel of Philadelphia.

Colore (Ital.).—The amount of ink applied.

Colored Edges.—The edges of books when stained.

Colportage (Fr.).—Book-hawking; itinerant bookselling; the obtaining of subscriptions and attending to the actual delivery of magazines, periodicals, books, &c.; in this country solely referring to religious books and tracts.

Colporteur (Fr.).—A book peddler; one who carries around and sells cheap books, religious ones and tracts.

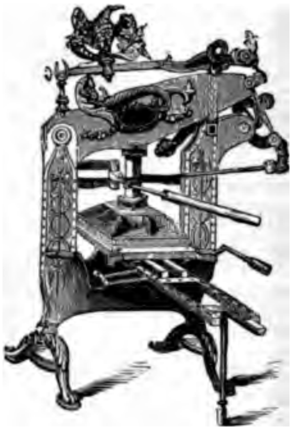
Columbelle (Fr.).—A blank line; a white line.

Columbian.—A size of type equal to two-line brevier, but very little used It is said to have been first employed on Barlow's Columbiad, when this was printed in elegant form in Philadelphia at the beginning of the century. It is not named in English books, but corresponds to gros texte in French.

Columbian Press.—An iron hand-press invented by George Clymer of Philadelphia in the early part of this century. See CLYMER, GEORGE.

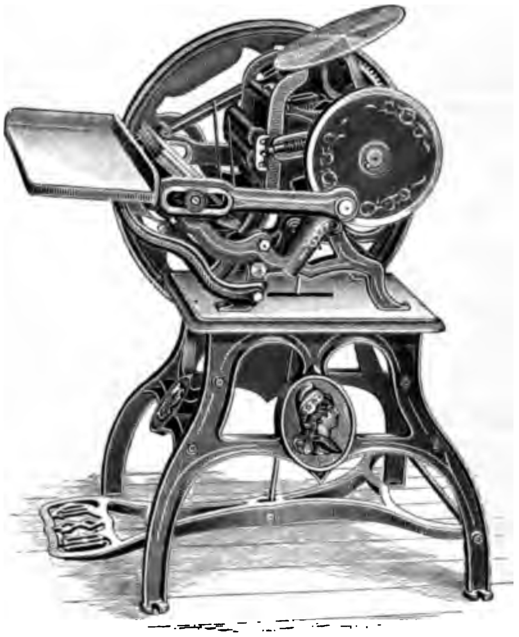
Columbian Rotary Press. — An amateur job-press, bearing some resemblance to the Gordon.

Columbus, the capital of the State of Ohio, has a large number of printing-offices, four daily newspapers and twenty-eight other newspapers. Printing began there in 1814, Col. James Kilbourne having the first press.



COLUMBIAN PRESS.

Column.—The assemblage of matter in a vertical subdivision of a paper or book. It is a collection of lines, and the reading goes down to the bottom, when it begins again. In books two columns to a page are common, but in dictionaries three or four are sometimes used, and occasionally there are works which have as many as six. In newspapers they range from two up to ten, but instances have been known where they have been as numerous as thirteen. As the measures for three, four or more columns of matter in books depend upon the nature of the copy or the whim of the author, it is impossible to say how wide they should be. They rise from three ems of the type used up to



COLUMBIAN ROTARY PRESS.

fifteen or twenty, while double-column books, printed on royal or imperial octavo, may be from twelve to fifteen ems of pica. In newspapers, however, they are determined by the size of the paper. Having settled upon this, if the sheet is to be a folio one fold is made and from an inch and a quarter to an inch and three-quarters allowed for margin. The number of columns to be used on a page being given, the thickness of the column rules is to be deducted and the amount divided. Paper 28 by 42 inches in size, for instance, makes a page 21 inches wide. Deduct one inch and five-eighths, the former for outside margin and the latter for inside margin, there remain 19⅜ inches. Eight columns will require seven column rules, which of brevier thickness would be three-quarters of an inch. This will leave 18⅝ inches, and this divided by eight gives as the width of each column fourteen pica ems. Nine columns will require the width of eight column rules to be taken out, or eight-ninths of an inch. The measure in this case will be twelve ems. Quartos and sheets folded still further are used, but few newspapers have ever used measures as narrow as eleven and a half ems, and few as large as sixteen, excluding of course those periodicals which do not depend upon news. The great bulk are published here in thirteen and thirteen and a half, English newspapers being a little wider. These are the sizes of the patent insides and of plate matter.

In making up columns in newspapers the head is toward the make-up, and he begins at the left-hand side, which is the first column. He usually places a nonpareil slug at the top, following the head rule, and then empties in his matter till the column is full, and proceeds then with the others. If the column is a little short he leads it out, putting a lead or two more at the side of dashes, or possibly leading a few lines at the head of an article. If too much he takes out a little. In long columns with many leads much must be allowed for sponginess. A column will drive up from a nonpareil to two lines of pica. With such matter great care must be taken. It is frequently well in such forms after tightening them up as much as possible with the thumb, and then with a few blows all around with the mallet, to unlock them and try them over again.

Column Galley.—A long, narrow galley, principally used for newspaper work.

Column Matter.—Type set in two or more columns is thus described.

Column Rules.—The rules which divide the columns of a book or newspaper. Usage seems at present to favor a reglet or a blank line between columns in books, and they are employed to a considerable extent in small, neat newspapers, but column rules are still much used in books, and the reasons for their adoption in newspapers seem so strong that they are never likely to be overcome. They certainly make a better mark of division than a white space. Column rules are of brass, type high, from the thickness of nonpareil to that of pica. If larger than long primer they are usually on some temporary job, and the requisite thickness is given to them by putting a lead or a very thin piece of reglet on each side. Nonpareil is generally regarded as too thin, those of bourgeois or long primer being most common. At the top the column rule comes directly against the head rule, the two lines joining; at the bottom from a pica to a double pica is cut away at the top of the rule, so that there may be a slug which may be partly inside and partly outside of the column rule, against which the foot-stick shall press. The bottom of the part of the rule which shows should come exactly even with the bottom of the o, m and s in the reading matter when that is locked up and is ready for press. Column rules should never be pieced when they are to be used repeatedly, as so much more care is required in making up and locking up as to destroy all saving arising from better pieces not being purchased. Type-metal dashes should not be used to help piece out. When cuts are interspersed the column rules must necessarily be in sections. If in an illustrated periodical, like Harper's Weekly or the Century Magazine, these pieces should be cut so that they will make a certain number of lines, with their leads, if leads are used, and these should be kept in a place by themselves apart from other rules. Column rules for an unforeseen emergency can be made out of ordinary six-to-pica brass rule, with leads on either side. If a rule gets battered take a file and file it till it makes no heavier mark than it did before. In this case, however, there is likely to be a little gap. Low column rules can be made higher by running them through a machine that will make a groove at the side. The deeper the groove, the higher the column rule will be. Any machinist will do this.

Com.—Abbreviation of the word "comma," used in the reading department of an English office.

Combination Borders.—See BORDERS.

Combination Leads and Slugs.—Leads or slugs made to exact lengths, so that they can be used singly or in combination. When employed together care should be taken that the joints do not occur in the same places line after line. All sizes can be made by putting together leads of the length made by doubling the figure 1 a number of times, as 1, 2, 4, 8, 16, 32 and 64, but it has generally been found that the first two sizes are too small; they can very easily be lost. A scheme can be made of six sizes, beginning at four pica ems and running up through five, six, seven, eleven and seventeen ems, which can be used together for all sizes up to fifty ems or even larger:

SCHEME OF SIX LENGTHS OF LEADS, BY WHICH ANY SIZES CAN BE MADE UP TO FIFTY EMS.

8	4, 4	30	4, 4, 11, 11
9	4, 5	31	7, 7, 17
10	5, 5	32	4, 11, 17
11	5, 6	33	11, 11, 11
12	6, 6	34	6, 11, 17; 17, 17
13	6, 7	35	7, 11, 17
14	7, 7	36	4, 4, 11, 17
15	4, 11	37	4, 5, 11, 17
16	5, 11	38	5, 11, 11, 11; 4, 17, 17
17	6, 11	39	5, 17, 17
18	7, 11	40	6, 17, 17
19	6, 6, 7; 5, 7, 7	41	7, 17, 17
20	6, 7, 7; 4, 5, 11	42	7, 7, 11, 17
21	4, 17	43	4, 5, 17, 17
22	5, 17	44	11, 11, 11, 11
23	6, 17	45	11, 17, 17
24	7, 17	46	7, 11, 11, 17
25	7, 7, 11	47	6, 7, 17, 17
26	4, 5, 17	48	7, 7, 17, 17
27	5, 11, 11	49	4, 11, 17, 17
28	4, 7, 17; 11, 17	50	5, 11, 17, 17
29	5, 7, 17		

Where a great deal is to be done with leads or slugs of uncommon measures it is better to have new ones especially cast. Rules are also made to regular lengths for piecing. See LABOR-SAVING RULES.

Combination Rules.—Labor-saving rules. Thus called in England.

Combs.—Instruments with wire teeth used in marbling. The colors being upon the surface, the comb is drawn across a portion in such a way that a new form is developed.

Come In.—When copy is got into a given space it is said to come in.

Comes Off.—A form that receives a good impression comes off well; if a bad impression it comes off ill, or it comes not well off. Also a phrase used in the gathering of books, for a heap that is gathered off is said to come off.—*Moxon.*

Cominciamenti or **Parti Eventuali** (Ital.).—The dedication, preface and other matter before the main portion of a book.

Coming of Age.—In England at the present time, and formerly in the United States, the coming of age of an apprentice is celebrated by the other workmen by the beating of drums, chases and other sonorous articles, and by jokes and sarcasms. Very often beer is sent for and drank around the imposing-stone. Frequently a present is received from the master. An apprenticeship cannot last beyond the beginning of the twenty-first year of the boy's life, no matter how worded in the indenture. After this time the apprentice is said to be free.

Comma.—The smallest of the pauses used in printing and the most frequent. It indicates when it is rhetorical a stoppage of about the length of time that a word would take to pronounce. Its use in printing is, however, not rhetorical. It appeals to the eye and points out the grammatical subdivisions and the intercalations in the sentence. There is always a rhetorical pause where emphasis is given, as in the phrase, "I said an *elder* man." A comma here would be entirely inappropriate, yet the sense cannot be given without a pause before elder. Much of the confusion which exists in the minds of students and literary men respecting the comma would be done away with if they had clearly fixed in their minds the difference between a pause of punctuation and a rhetorical pause. See PUNCTUATION, where this is more fully treated. There are many uses of the comma besides the breaking up of the sentence into parts where pauses are required. A comma is found on an average once in forty or fifty letters, being more frequent than any character except ten or eleven. It follows a period or an apostrophe when these marks indicate abbreviations and the sense requires it; it divides a number of figures from each other, so that they can be readily counted, as in 241,753,246; it indicates the omission of two letters in the Scotch prefix Mac, as in M'Neal, M'Key, the comma being inverted; two of them being used together, inverted, mean do., ditto, the same, and in this case frequently follow after each other in a long series. They are employed inverted at the beginning of quotations to note their commencement, and are repeated at every paragraph till the end, as are all quotations within the first one. Each takes a thin space after it, unless there should be much shoulder at that part of the next letter. Our usage is for the first quotation to be double, the next one within to be single, the next double, and so on, but the English reverse this, on the ground that the first one who speaks should have but one mark and the second two. Formerly there was a habit of quoting down the sides of paragraphs, single or double, as the case might be. On the Tribune in Horace Greeley's day this was common, and it is still common in England and France. It serves to direct particular attention to the quotation. Commas are not much employed in the title-pages of fine books, where with other punctuation marks they are frequently entirely omitted. They are generally very thin, and are liable to peel off the ends of lines, particularly when the measure is long and the type is leaded. Their use in foreign languages for purposes of quotation is very different from ours. In this case in French they are known as guillemets, their form being changed, but in punctuation they are called virgules. The virgules take a thin space before them, the theory being that they refer to the whole of the words in that subdivision of the sentence. In Dutch religious books a stroke like a shilling mark has been in use since the invention of printing to indicate a comma. Such was the general usage once with all languages. In tabular work in English commas are sometimes cast on en sets.

The theories of the use of the comma are numerous. Close pointing and open pointing have each their advocates, but when one method is adopted it should be adhered to. Many sciolists have scarcely any better rule than the compositor who when asked how he determined where they should go replied that he put one comma in his first line, two in his second, three in his third and then began again. It must have been this compositor who lately in a London paper punctuated a sentence thus: "Some of these fine days, I expect to hear, the First Lord of the Admiralty, asserting that C. E. D., is the greatest living authority, upon naval gunnery."

Commence Quote.—The expression used by a proof-reader to denote the beginning of a quotation made by turned commas.

Commence Turns.—Reversed double commas (") used in the reader's closet to indicate the commencement of any quoted passage.

Commentary.—1. Critical observations on the text or subject matter of a book. 2. An account of particular events, as Cæsar's Commentary.

Commercial A.—A mark (@) used instead of at or to, the latter usually in American printing-offices, as: It was sold @ 91 cents a pound; it brought 8 @ 9 cents a yard. In newspapers the letter a is sometimes used instead of it, but it is better in such cases to spell the word out.

Commercial Envelopes.—In England envelopes to take large post octavo in three folds, 5½ × 3¼ inches; in America envelopes used for commercial purposes.

Commercial Letter.—A folded writing-paper, generally 11 by 17 inches.

Commercial Note.—A folded writing-paper, generally 8 by 10 inches.

Commercial Signs.—The arbitrary marks and contractions among commercial men to indicate certain ideas. The more common ones are: £, pound sterling; $, dollar; /, shilling; ⅌, per; ℔, pound weight; @, a or to; %, per cent., and ℀, account current.

The shilling, per cent. and account current do not come with a font unless especially ordered. There are a great number of special commercial marks in German, and owing to the fact that foreigners read the Roman characters easier than the German it is common in Germany to print price-lists with them, thus necessitating the purchase of many extra sorts.

Common Paragraph.—The ordinary paragraph or verse, indented one em at the beginning of the first line and flush at the beginning of all others. It is denoted either by ¶ or [.

Common Points.—Ordinary points upon a press, with a pin or spur attached, in contradistinction to spring points.

Commutation Tickets.—These are in two forms, cards and books. When a card is intended to be used any length of time tough railroad card is needed. But those generally used are intended to be given up every month, and a tough paper or thin cardboard will answer. Small books with perforations dividing the ticket from stubs are also very generally used.

Comp.—Abbreviation for companion or compositor, much used by compositors in England; for the latter word it is beginning to be heard in the United States.

Compagnon (Fr.).—A journeyman.

Companions.—Two men who work at a hand-press are thus styled, as also the members of a companionship or body of compositors working together under a clicker.

Companionship.—A number of compositors who work together under a clicker. He makes up the matter, gives out the copy, finds sorts, imposes and does all he can to facilitate the work of the other men, and for this he receives as much as the quickest one of his companions. Each of the compositors keeps a record of the number of lines he has set, to which, when all the men's work is put together, are added the head and foot lines, blank pages and fat. They receive pay together and divide results. It is thought in England this is an advantageous arrangement, but it has been very little used in America.

Comping.—A slang term in England for composing or setting type.

Complementary Colors.—Those colors which accentuate or strengthen each other, as orange and blue or blue and gold.

Complete Font.—A font of type, including capitals, small capitals, lower case, figures, accents, spaces, &c., as distinct from sorts or a small font from which some kinds of characters have been omitted.

Complettmaschine (Ger.).—A perfecting press.

Compo.—An abbreviation used in England for roller composition.

Comporre (Ital.).—Composition.

Compose.—To set up type.

Composer (Fr.).—To set (type).

Composing-Machines.—Mechanical appliances for setting type. Various kinds have been invented from time to time, which are fully described under their respective names and under TYPESETTING MACHINES.

Composing-Room.—In a printing-office, that portion which is occupied by the compositors. It is usually on an upper floor, as better light can there be obtained, but may be anywhere else. In one large office in New York, which does much composition, it is in a basement. According to the class of work done, whether newspaper composition, job-work or bookwork, different methods of laying out the space are required.

An office for newspaper work should allow each man a double frame if possible, one of these backing another. In front of each one there should be room enough to pass easily. The length of two cases is 65 inches and the depth of a frame and its case about 28 inches. Thus the two men will require a space of 65 by 56, which by adding 18 inches for each man's half of an alleyway will be a total of 65 by 94 for both, or an area of about 21 square feet for each man. The frames and their alleyways cannot take up more than half the space in all, so that to employ ten men an area of 420 square feet is necessary, for thirty men 1,320 square feet and for one hundred men 4,200 square feet. Those who are cramped for room can double up the men on the stands and transfer the make-up to another room, but this is not good policy. Rooker cases will effect a little saving. The windows should be wide and high. It is not important that they should come near the floor, but they ought to reach a point ten feet above it. Each man should have a set of cases for all the type used in the office, whether two, three, four or five. Several Italic cases should be provided for each, as well as cases for two-line letter, and if full-face is much used in advertisements several cases also of that kind of type should be available. Accents and uncommon characters should be in a little cabinet and not in the Italic cases. For the fancy letter cabinets should be provided, and only one man should be allowed to set or distribute in them. Font cases or sort cases should be of large size, and kept locked, so that application must be made to the foreman or store-keeper each time any sort is needed. The compositors' frames should be provided with a little drawer, which can be locked, and each man should have two sticks at his disposal. Full half measure, scant half measure, full third measure and scant third measure should be provided by the office and kept in a place apart. Of the former one to four men is enough; of the latter one to eight. The difference between the full third measure and the scant third measure is that a rule is introduced between each of the little columns, the two rules and the three columns making up the ordinary measure. Several large sticks should also be in stock. Many men will desire their sticks japanned or nickeled, as the heat of their hands rusts the utensil. Compositors provide their own rules and copy guides.

The quantity of type necessary depends upon the kind of newspaper. Roughly speaking, a page of a daily newspaper contains a hundred pounds of type, large ones more and small ones less. If there were no weeklies or semi-weeklies, no extras or supplements, and but one kind of type were used, there would be enough type when the four or eight pages were full. There would be a residuum in the cases of about fifteen pounds each, so an eight-page paper, having twenty-five men, would only need about 1,175 pounds. But most offices use three sizes of type, and some four or five; much is set up that cannot conveniently get in the day it is intended for and is held for several days before being distributed, and there are the supplements and the weeklies. Each compositor who has four cases has about sixty pounds of type left in them at the close of his day's work. Thus a newspaper printing a semi-weekly, weekly and Sunday paper, the latter being sixteen pages and the former eight, in four sizes of type would need enough letter to put up twenty-eight pages at once, or 2,800 pounds, and supposing there were fifty compositors 3,000 pounds would be left in the cases. But another disturbing element comes in here. The copy may run on nonpareil, minion, agate or brevier, and the foreman cannot foretell which it is to be. Consequently at least one-half more must be added to the 2,800 pounds to provide for this contingency. In large newspapers in our very greatest cities 10,000 pounds is thought to be rather a small allowance, and some of them have from 16,000 to 20,000 pounds. The amount of matter killed without having been used is very great. An instance happened not long since in New York in which an editor killed 110 galleys of unused matter in one day.

Chases, galleys, imposing-tables, cases and all other things should be provided up to the utmost limit of requirements. The success of a newspaper frequently depends upon being able to get in news a little later or a little fuller than its contemporaries. The standing galley for compositors to empty on ought to be as nearly as possible in the centre of the room. There, too, should be the foreman's desk and the copy desk. The proof-press should be near by. The making-up requires considerable room, and the form-tables should therefore, if convenient, be at one side. Stereotyping should be executed in a room entirely apart. There is much noise from it and deleterious gases are constantly arising.

In a job office of any size the foreman should have his desk somewhere near the entrance, that he may see his customers as they come in. They are obliged frequently to look at their work and give further directions. The proof-readers should not be far from the foreman. Around the outside or walls of the office should be arranged the type in cabinets or racks. They need not be against the wall, but placed in order as compositors arrange their frames. The wooden type, huge metal type, body type suitable for poster work and the coarser wood-cuts should be together, and the rest placed according to their styles, Gothics being in one location, and the same rule being followed with Clarendons, Ionics and other much used faces. It is better to have the small type at the top, the sizes growing larger as they approach the floor. Throughout the room imposing-stones should be placed, and good racks should be provided for holding forms, both dead and live, and chases. The job-room should only have body type enough for its own needs, as large books with job-work interspersed might better be set in the book-room, the jobbing part being sent in to them. Such an office needs many cabinets or stowing-places for leads, brass rule, quotations and other indispensable things. An allowance of a thousand dollars' worth of material for each journeyman employed is a very moderate one.

Book offices need abundant light, as well as newspaper and job offices. In these the foreman generally has his desk in the centre, but the proof-readers are at one side. One proof-reader is required for ten or twelve compositors if the work is not very careful, but if it is very tedious it may require one to six or seven. The proof-room should be partitioned off from the rest of the office. Each compositor should have a double stand, having a rack at one side, and in this should be placed the cases he is generally using. An uncommon face or size of type should, after being used, be taken by the store-keeper and locked up in the store-room. The store-keeper should also take charge of all material in use which does not belong to a particular compositor. He should know where every case, set of rules, peculiar sort or chase is, and should see that a sufficient quantity of each thing needed is on hand. He should not be given authority to buy, but simply to watch over what is in possession and to notify the foreman of anything needed. If the work is general five hundred pounds of type at least will be required for each compositor. See further on this topic under BOOK-ROOM, DAILY NEWSPAPERS, JOB-ROOM and PROOF-READING.

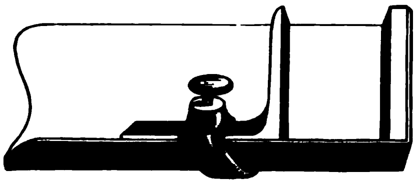
Composing-Rule.—A thin plate of brass, steel or zinc placed next to a line of type and used to facilitate the dropping of letters into the next line. It is usually just type high, and has ears or projections on one or both sides. A make-up rule is the same thing without ears, and with a projection in the middle. It was thus made by Henry M. Failing, the inventor, because he was continually losing the ordinary rule, without projections, which he used in making up a daily paper. He argued that if one was made higher than ordinary it would be impossible to overlook it in planing down.

MAKE-UP RULE.

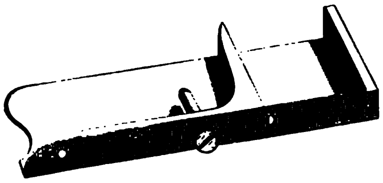
COMPOSING-RULE.

Composing-Stick.—The metal three-sided box held in the compositor's left hand, into which he puts the letters which he takes from the case. The earliest printers probably did not have a stick, the type being apparently put into the chase directly with the fingers. The roughness of the type used and the difficulty of getting an exact justification must be the excuses which ought to be given for much early work, the letters having been secured probably by thin wedges in places where the form would not lift. The first stick was, as its name implies, of wood. Strips of wood were tacked together with nails, and each new measure required a new stick. Hubert Rey, of the city of Lyons, in France, is credited with being the first who made a metal stick. It was patented on December 5, 1796. Up to that time wooden sticks were still in use in England, but it can hardly be believed that metal sticks were so late in appearing. In Moxon's Mechanick Exercises is shown a stick which does not look like a wooden one. This was published in 1683.

There are four or five kinds of sticks in use. The common newspaper or book stick is from six to eight inches long. It consists of three parts. There is first the frame, which is a straight piece of metal of the whole length, and about two inches wide. At the back it turns up about half an inch, for most of this way having holes or slits, through which the screw can readily pass. At the end there is another piece, thicker than the others, which is firmly welded into them and is at right angles with both of them. The movable piece has a stout transverse part exactly opposite to the end piece and perfectly parallel to it, which has to secure it a slip of metal, running evenly with and inside the back. This has a long aperture or slit in its centre, through which the screw passes. This movable piece and the solid ones form the bottom, back and two sides of a box, which can be diminished or increased for width at pleasure. To secure this object the back of the movable part has the nut of a screw resting against it, the head being at the other side. When it is required to change the stick from one measure to the other the screw is loosened, the arm is moved as much as may be required, and then the screw is tightened again.

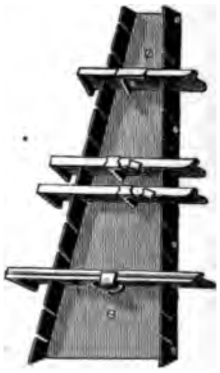


IMPROVED COMPOSING-STICK.



ORDINARY SCREW COMPOSING-STICK.

The same fastening that is done by the screw is accomplished in other sticks by springs, clasps, friction and other ways. Some of the changes are more swiftly accomplished; other plans leave less room for inaccuracy. Wooden composing-sticks are generally used for long measures. The metal ones only extend to a foot or thereabouts; but wooden ones can be made two or three feet long if necessary. They are much lighter. The usual material is mahogany. Another form of metal sticks is to have two or three pieces of metal running up and down, to divide measures. They are valuable in tables, as several justifications can be performed without setting down the stick. Iron is the usual material for sticks, but it is frequently japanned or nickeled, which prevents the utensil from rusting. Gun-metal is also used. There are some compositors whose hands are always hot and moist, rusting a stick sufficiently to leave a mark on their hands in half a day. On a daily newspaper, where there is no change of measure, it is well to have the sticks welded, so that there can be no accidental variation. Sticks sometimes get out of true by being allowed to fall on the floor. When this is the case, or it happens from any other cause, a temporary alleviation can be secured by putting a piece of paper or card-board between the arm of the stick and the back of the tool. Placed between the screw and the type it makes the measure wider for the last line than the first of a stickful; placed beyond the screw it makes the last line smaller. These are only makeshifts, however, and the best plan is either to send



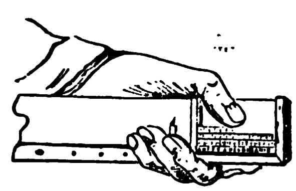
COMPOSING-STICK HOLDER.

the supposed defective stick to a machinist or to discard it altogether. A good test is to have a block of brass or steel made of exactly the size of a stickful of type and perfectly square cornered. When this is put in it will show the discrepancy just as it is. Another test is to bring the two sides against each other by unscrewing the hold. The error, however, may be beyond this part of the stick. Special contrivances are sometimes employed to hold sticks when out of use.

Sticks in foreign countries are generally far smaller or shallower than ours. Some are used in Italy in which not more than two pica lines could be put.

Compositeur (Fr.).—Compositor.

Composition.—1. The art of putting types together so that they shall form words, lines and pages in orderly succession; that part of the work of a printing-house which relates to type alone and precedes impression. Composition employs very many more persons than presswork, and the number engaged in the warehouse or in the counting-room is inconsiderable in comparison with either of these. Forty or fifty years ago, when the trade was still systematically taught to apprentices, the boy who entered for a five-years' term wrought at least three of them at the case, and probably composition was his first work. A good compositor needs, in the first place, a fair common-school education, as he must decipher difficult words, know the names of celebrities and geographical places, correct obvious errors of grammar, and divide and punctuate words according to rule. He probably does not know most of these well when he enters, but the groundwork must be there. He must be in health, his eyesight should be good, and he should have sufficient strength to stand the fatigue of a day's work. His first occupation will be to learn the case. This he does, stick in hand, having been given a bit of copy to set. It is often thought by boys that it would be a good idea to label the boxes, so that they could be found more easily and more certainly, and there is reason for this view. But in the cases learned by ninety-nine out of a hundred none is labeled, and it depends upon memory to know them. It is at this time the boy acquires bad habits. The compositor who is placed in charge of him should be free from false motions, and must be methodical and capable of doing a good day's work. If he fails in any of these respects the boy is very likely to follow him. The lad should stand erect in front of the centre of the case, and should endeavor to see the type he is going to pick up some little time before his hand reaches the box. It should be caught near the head, the nick being away from the compositor, and brought into the stick at one motion. Here it should be met by the thumb of the left hand and brought down to the bottom of the stick, which should be near the box from which the letter was taken. The left hand, with the stick in it, should follow the right as it goes to a box. This rule, as laid down in all the printers' books, is rarely followed with any strictness, but the result is very gratifying where it is done. Care should be taken to avoid wrong methods. Among these may be mentioned striking the top of the type already in the stick, fumbling for a letter, describing great curves in the air so as to give time to turn the letter around in the fingers, and striking against the centre bar. There are many others. Each of these actions prevents speed, and as most compositors are paid by measurement it is very important to form good habits at once. If one type is dropped two should be picked up. When the boy's first line is full he is shown how to space it out and justify it, or how to fill it exactly with spaces, which shall be as nearly as possible of the same dimensions. In thin spacing, when more letters must be put in the line, the three-em spaces which are in it must be changed for four or five em spaces, and in wide-spaced lines either the spaces are changed to en quadrats or four or five em spaces are added. Double spacing is considered the limit in good work, and this rule is never transgressed except in case of necessity on books. Newspapers, which are hurriedly put together, although acknowledging the same rule, allow up to an em quadrat. It is important that the apprentice shall have a clear idea of what a well-justified line is, neither too tight nor too loose. A very difficult thing for a boy is to learn to empty a stick. It is put against the lower ledge of his case. He places two of the fingers of each hand, the index and middle finger, against the last line of the stick, which is followed by his composing-rule; the two other fingers are bent and pressed up against the sides, while the thumbs are at the back. A lead or a brass rule should be allowed for the apprentice at the back, although journeymen rarely use one for emptying. The type is then pushed out a little at the top and raised at the same time; then this is done at the bottom and repeated at the top. By this time the type is nearly free of the stick. Great care should be taken by the boy at this moment not to get nervous nor to give an undue pressure on one side. Clasping the stickful firmly, but not with great force, it is carried to the galley and there deposited, being brought up squarely against the matter that was there before, and neither inclining to the right nor the left.



METHOD OF HOLDING THE STICK.

The next operation is distribution. A boy should not be allowed more than a stickful at once. He takes it up and sets it on the two lower fingers of his left hand, a brass rule acting as its support. Back of it are his two fingers and at the side his thumb. The matter ought not to be very dry, yet neither should it be so wet as to drip profusely. A sponge on which the wrist can rest is of value to prevent dripping. It is put on the lower ledge and the wrist is placed directly upon it, the weight being sustained by the ledge. The apprentice takes off a word of five or six letters from the right-hand side of the handful and proceeds to put the characters in their places. He holds his fingers somewhat perpendicularly, and drops the letters one by one into the boxes, carrying his hand completely to them. He then takes up the next part of the line, always making sure that he has the whole of a word, and lifting no more than he can remember. Much time is lost in looking a second or third time at the matter after it is in the fingers. The spaces must be distributed with the most scrupulous accuracy. It would be well for his instructor to look at his four and five em boxes after he has completed the distribution, point out those that are wrong and make him sort them all over if the work has been very badly done. Every letter dropped into a wrong box must be hunted for at once. As the apprentice gets more experienced larger handfuls can be taken, but these ought never to exceed what the hand can easily grasp. One pied handful in a year will lose more time than can be gained by large handfuls in that time. The foreman should forbid piling matter on top of a regular handful, as is seen sometimes when the matter thus held by the left hand is ten, twelve or even sixteen inches high. Such handfuls are made by taking up all that the hand can grasp, and then adding stickful after stickful till as much is placed there as can be held.

He should be taught all the smaller boxes, how to tie up a handful of matter, how to correct either on a galley or on the stone, and in fact how to do everything which appertains to the work. But in the present absence of an apprenticeship system, the unwillingness and inability of men to teach, and the conviction of employers that it is useless to do so, as the boy will leave the moment he becomes of any pecuniary value, it will seldom happen that he will be thus taught. He must therefore study the art by its examples, doing what he is permitted to do as well as he knows how. All compositors must learn the sizes of type and their relative proportions, and all must learn to spell, capitalize, punctuate and divide according to rule. But the book compositor in addition must learn the rules for proportion of type in use, how to set title-pages, folios, bastard titles, chapter heads, indexes and tables of contents, and how to sink and space them. He must know how to tie up matter and paper it so as to be put away; he should be versed in making up on the galley and on the stone, and should know how to cut and lay out furniture for a book, having only the type and the sheet of paper before him. He ought also to be able to read a proof. Until he can do all these things he cannot be said to know his trade, no matter how many years he has been employed at it. The newspaper compositor must be able to set much in a little time, to decipher bad copy quickly and to read proof. He may also be called on to give out copy or to make up, and he must be a man of general knowledge or his short takes will frequently be totally unintelligible to him. The job compositor has a thousand things to learn, but what he chiefly requires at the beginning is taste. Mechanical skill can be gained after a time, but unless directed by taste it is almost useless. In each department the compositor needs constantly to examine the best work from other offices, and in a job office this is indispensable. Full directions are given in this work for each operation of the compositor, as well as explanations of the tools he employs and the processes used, and further information should be sought for under those heads.

2. Rollers made principally of glue and molasses. They are often spoken of in this manner in England, and the abbreviation compo is also much used there. In America the mixture is generally spoken of as ROLLER COMPOSITION. See under this head and also under ROLLERS.

Composition Kettle.—The utensil in which the glue, molasses, &c., used in making rollers are boiled. It is in two parts, an outer and an inner one, separated from each other by a little water. This prevents the heat in the inner one from ever rising higher than the boiling point of water.

COMPOSITION KETTLE.

Compositojo (Ital.).—A compositor's stick.

Compositor.—One who sets up type. There are three divisions of workmen in a printing-office, excluding the clerks and laborers, who work in one part just as they do anywhere else, with no special knowledge of the procedures. These three classes are compositors, pressmen and readers. The compositor is the one who gets the form ready for printing, the reader examines it for errors, and the pressman prints it. Many compositors have an acquaintance with proof-reading, but very few with presswork, yet in a former age it was general to know both branches. Franklin, after setting type a long time in London, conceived the idea that it would be better for him to labor for a while at press, as giving him more exercise, and seventy years ago James Harper and Thurlow Weed wrought at either branch, as occasion might require. When hand-presses went out of use few compositors learned the machine-press, and at the present day it might be said that there are scarcely a hundred compositors in New York city who are familiar with the power-press. Compositors in the large cities, if they begin there, have generally been errand boys and copyholders or employed about job presses, and have picked up their first knowledge of composition by themselves. Afterwards they were allowed to do a little more, and by working for three or four years increased their knowledge sufficiently to be employed as journeymen in some one branch. Few, however, learn their trade in the city; most printers come from the country, and both they and city-bred boys need much instruction after reaching twenty-one years before they become really capable workmen. Scarcely any are indentured or receive regular instruction. Compositors are divided into book, job and news. The last earn a great deal the most; the job men come next, and the book hands the last. This smallness of wages is owing to several causes. There is much irregularity as to the work, and the men are frequently stopped for type and other material. Add to this a constant competition by the small towns, where rent and food are cheap, with the great cities, and the necessity employers in the latter feel for meeting their competitors in the matter of price, and most of the difficulty is explained. Job compositors work by the week, receiving in the large towns from fifteen to twenty dollars, and have comparatively little lost time. Newspaper compositors are of two classes—one where a weekly or bi-weekly newspaper is made ready with some approach to the neatness of bookwork, and the other where it is on daily newspapers or differs little from them. In the former case, unless there is much standing matter, many quadrats or tables or a great deal of leading, the work is generally lean. It may also be so on a daily, but is not generally. Each office employs make-ups or stone-hands, and many book and job offices have men who do little else than tablework.

The number of compositors increases faster than pressmen. In well-regulated offices at the beginning of this century the two classes were generally on an equality, but now that the presses have doubled, tripled or quadrupled in size, and at least quadrupled in speed, the compositors are by far the most numerous. In some cities of the Union they number ten to one; in all they are two to one. It is supposed that in New York city there are sixty-five hundred compositors and two thousand pressmen. The compositors double every twelve years, while the general population of the country requires more than a quarter of a century to make the same increase. Their general education is less than it used to be, and their technical skill is less, taken generally; but the establishment of subdivisions and the constant practice of keeping men steadily engaged upon a particular class of work have brought out a degree of expertness in such branches which could not formerly have been rivaled. Fewer men can set a good title or dedication, or plan a book, than half a century ago, and those who can lay out the furniture of a new form are very rare. On the other hand, the workman of the present day is more sober. He does not in this country observe St. Monday, and, aside from those living in New York and Chicago, he is very frequently the owner of a little house. His occupation seems to be a wholesome one, and there are very few cases now of hang-wrist or printer's paralysis; consumption seems to have lessened, and disorderly and drunken men are much fewer. Whatever may have been the healthfulness of the trade once, there can be no doubt that it is now a wholesome one. Journeymen frequently pass seventy years of age, and instances of master printers employed as compositors most of their lives who have attained eighty or ninety are not rare. In Germany a compositor is called a Setzer, and in France a compositeur. In those two countries the number employed on bookwork is far greater than here, and on news far less. Many women are engaged in the trade in Paris and in smaller French towns, but not many in America. See FEMALE COMPOSITORS.

Compositore (Ital.).—A compositor.

Composizione (Ital.).—Composition.

Composteur (Fr.).—A composing-stick.

Compound Words.—Two words connected by a hyphen.

Compound Fractions.—Fractions in which either the numerator or denominator or both have fractions. Thus $\frac{4}{13}$ is a simple fraction, but $\frac{4\frac{1}{4}}{8\frac{3}{4}}$ is a compound fraction, this being an easy method of stating an arithmetical relation.

Compounding.—The method of joining two or more words together by a hyphen, thus making them grammatically a single one. This practice has become a very common one since printing-offices grew large and trained proof-readers grew accustomed to making the nice distinctions necessary to preserve uniformity. In some cases hyphenizing is absolutely necessary, if the sense is to be gathered easily, as in the old conundrum: "Did you ever see a rope walk?" Clearly the idea is very different here from the question, "Did you ever see a rope-walk?" For the printer's use there are three kinds of words. In the first the idea is simple, as in book. The second is a compound. In the third this and another word are consolidated into one, as bookseller. The original idea of seller and of books has completely passed out of mind, and the thought of a bookseller is complete in itself. In some cases, as in bookmaker, used in the sporting sense, the idea of book and of maker has ceased. There is no book known to most of those who bet, and nothing is made (bookmaking—betting). But in book collector two forms can be used. If we consider the two words as modifying and affecting each other, and yet to some extent bound together, book-collector is used; but if collector is considered as a calling or amusement, as one might say cane collector, leather collector, hat collector, then the two words are separated. Custom dictates the rule. When words are infrequently used together, and are not under the operation of a general law, they are separated; more closely used, they are hyphenized; and wedded together they form one word. No rules can be laid down which will not admit of many exceptions. It has been the custom of proof-readers to refer to their dictionaries, which give many compounds. It is difficult, however, to discover upon what principles the words have thus been united by Webster and Worcester, and the same words which are united in one place may not be joined in another place. Thus copperplate is given in a well-known book on printing as copper-plate, but if the author had been speaking of such a plate of copper as might form the foundation of a machine he would say "that a copper plate of great solidity was used." Whatever method is adopted should be carefully adhered to through the whole of a book. Authors are advised to leave the regulation of this matter in the hands of the proof-reader. He will be apt to adhere to a more consistent method than any one else.

Concordance.—A book which affords a clue by indexing so that a reader who wishes to know where a certain quotation is can tell, if he can remember one or more of the prominent words. There are few concordances in English excepting those to the Bible and to Shakespeare. A concordance is made by writing each line upon a sheet of paper as many times as there are words. Against each of these lines the reference is written, as: Jer. 11, 14, or Mer. of Ven. 3, 4, 11. In the former the reference is to the chapter and verse, the chapter for convenience' sake being put in figures instead of letter numerals, as usual, and in the latter to act, scene and line. When the whole is done the lines are gone over, and if there are seven words in one each word in turn has a line drawn under it, which is the one under which it is indexed. The copying and references are carefully verified, and then the sheets are cut apart, each line making a separate slip. To do this well the sheet should not be more than three or four inches wide and an inch should be allowed for each reference. The slips are then classified, the best method of doing this being for the first division to be in about four parts, A to D making one, E to K a second, L to Q a third, and R to the end of the alphabet the fourth. In the second classification the letters are separated, except that I, J and K are put together, O, P and Q are treated as one, and U and V and X, Y and Z follow the same rule. This is continued till the separation is complete to the last letter of the word, occasions coming after occasion, and Jedediah before Jedidiah. In Bible concordances when the word is finally reached the references are arranged under each other by the books in which they occur and the chapter and verse; the alphabetical idea is not used in the context. Thus all the extracts from Genesis are given before one is used from Exodus, and chapter five is completed before chapter six is taken up. The extract makes one line generally, and the word quoted is usually in Italics or heavy type and abbreviated. In Dr. Strong's Concordance of the Bible, the latest and best, the word noted is in Italic, abbreviated, and with a turned period after it. A line consequently looks thus:

synagogue
Luk. 7, 5. He hath built us a *s*˙
8, 41. Jairus . . . was a ruler of the *s*˙

Concordanzen (Ger.).—Large pieces of metal used in printing-offices for blank spaces in pages, &c.; in English, metal furniture or quotations.

Condensed.—A kind of type that is thinner than usual. All fancy faces are liable to be thus treated by the type-founder, nor are Romans exempt. **These three words** are in ordinary Gothic, while these three words are in condensed Gothic. Extra condensed is thinner yet; while double extra condensed implies the greatest thinness that can be attained.

Condition.—Rollers are said to be in or out of condition according to their fitness for use, and formerly paper was said to be in or out of condition as it approximated or departed from the proper state of moistness necessary for working.

Conditions of Sale.—The class of legal work embracing conditions and particulars of sale.—*Jacobi.*

Congreve, Sir William.—The inventor of a press in England which printed in colors. It was perhaps the earliest of this kind. He was born in 1772 at Woolwich, England, and died as a general of artillery at Toulouse, in France, in 1828.

Connecticut.—Printing began in this colony in 1709 at New London. Before the Revolution it was also carried on at New Haven, Hartford and Norwich. A great deal of publishing has been done for a hundred years at Hartford, and this is now the centre of the subscription-book business of the Union. New Haven and Norwich have also done a great deal in book publishing. There were in 1890 seventeen dailies, ninety-nine weeklies and twenty-three other publications in this State.

Connection.—In passing sheets of a work finally for press the reader sees that the sequence from sheet to sheet is preserved and not disturbed by any overrunning. This is also done in the previous galleys. On daily newspapers it is usual to end galleys on a divided word, part of a word being on the first galley and part on the second. It is looked upon by them as very bad usage to end a galley with a paragraph.

Conner, James.—The originator of the type-foundry known by this name was born in Dutchess County, N. Y., on April 22, 1798. In 1811 he was apprenticed in New York to Samuel Brower, publisher of the Public Advertiser, but his indentures were canceled, and he wrought in the offices of several other printers before coming of age. In the office of John Watts, who was the first stereotyper in America, although an Englishman, he learned the elements of the stereotype art, rap-

JAMES CONNER.

idly becoming very skillful. On the promise of a large salary he removed to Boston to take charge of a stereotype-foundry there, and having by great industry and economy succeeded in saving $3,000 returned to New York at about the beginning of 1827. Soon after he conceived the idea of stereotyping large type for posters, which proved a success. They were blocked on wood. He began, also, the business of type-founding, making a lighter face than the other founders. He also stereotyped largely on his own account, choosing books which would be likely to have a permanent sale, such as Maunder's Treasury of Knowledge and Shakespeare's Works. He was very bold in the transaction of business; so much so, in fact, that he was several times in great embarrassment in consequence of it. Among other improvements made by him was the precipitation of a matrix by the electrotype method, now common enough, but then unthought of. He purchased the right to use the type-casting machines of David Bruce, Jr., and for many years was the most extensive manufacturer of machine-made type in the country. He was engaged in many public enterprises, and served six years as county clerk, being a great favorite with those who knew him. He died on May 30, 1861.

Conner, James Madison, the type-founder, was the son of James Conner. He was born on November 2, 1825, in the city of New York. He entered his father's foundry at thirteen or fourteen years of age, and in time was placed in charge of the mechanical department, in which he excelled. He was admitted into partnership with his father and elder brother, William Crawford Conner, about 1858, the title then being James Conner & Sons. On the death of the senior in 1861 the title was changed to James Conner's Sons, which it has ever since remained. Mr. Conner devoted himself closely to business, making many improvements and obtaining a large number of patents. He died on July 14, 1887, two of his sons, Charles S. and B. F., continuing the business.

Conner, William Crawford, the eldest son of James Conner, the type-founder, was born in New York on December 4, 1821. He learned the type-founding business, was sent as an agent of his father to California when the gold fever began, and returned and was admitted into partnership. He was for one term sheriff and also served as county clerk. He died on April 26, 1881.

Connessione di Tipi (Ital.).—Harmony of faces of type.

Conscience (Fr.).—A weekly or salaried hand, in contradistinction to one who works by the piece. This is one of the most singular expressions in the French typographical nomenclature. It undoubtedly comes from the time when the printer worked conscientiously, as if the eye of the master was upon him.

Consecutive Numbering.—See NUMBERING.

Consonant.—A sound which cannot be fully uttered except in conjunction with a vowel. Consonants form the basis of nearly every system of shorthand. Only about half the sounds are of consonants, yet many words are complete enough to be read without inserting vowels, and thus the time of writing them is saved. The following is an instance, a turned period being put where a vowel or other letter is omitted:

B·t w·n th· f·rst c·m·, th· s·p·os·d th·t th· sh·d h·v· r·c·v·d m·r·; ·nd th· l·kw·s· r·c·v·d ev·ry m·n · p·n·y.

At length it reads: But when the first came they supposed that they should have received more; and they likewise received every man a penny.

According to some printers, words are divided between two consonants, when they apparently belong to two syllables, as japan-ned, travel-led, din-ned, but this rule is not generally accepted, nor the spelling which is here given to the first two words.

In the Semitic languages, as a rule, only consonants are used as letters, the introduction of vowels being by dots or dashes placed above or below the letters. In Hebrew, for instance, all the twenty-two characters of the alphabet are consonants. These points were not always used, but were introduced after the Israelites were expelled from the Holy Land. In early Hebrew times, when no other language was used by the Jews, and when every one was perfectly familiar with the words of the Scriptures, nothing more was necessary than a mere reminder for the remainder of the word to come into the reader's mind. At the present day, among those familiar with the Scriptures, the repeating of a word or two will bring up the remainder of the sentence. Thus in Hebrew sapher, book, is spelled sphr. The introduction of these points makes the great difficulty in Hebrew and Arabic composition.

Constantinople.—In 1888 107 books were published in Constantinople in Turkish, forty-nine in Greek, forty-one in Armenian, eight in French, three in English, four in Bulgarian, three in Hebrew and one in Volapük. It possesses forty printing and as many lithographic establishments. The population of the city is about seven hundred thousand.

Contents.—That part of the preliminary matter of a book which gives a description of the text it contains, with the page references. A table of contents is frequently set in small capitals, but sometimes in Italic. Roman, however, is most common. All the sizes from nonpareil to long primer are used, being in general about one size smaller than the text type.

Contractions.—Abbreviations, indicated by accents over or through the letters, or by special characters. See ABBREVIATIONS.

Contrefaire (Fr.).—To counterfeit.

Contre-Maitre (Fr.).—A foreman or deputy foreman.

Co-operation.—Action of several persons together for a common end. See INDUSTRIAL CO-OPERATION.

Co-operative Printing.—See PARTLY-PRINTED NEWSPAPERS.

Coperti (Ital.).—The (paper) cover of a book or pamphlet.

Cope's Press.—The Albion iron hand-press, invented by Richard Whittaker Cope, and much used in England. See ALBION PRESS.

Copia (Ital.).—Copy.

Copia Tempestata (Ital.).—Copy filled with Italic, small capitals or other sorts.

Copie (Fr.).—Take of copy.

Copper.—A metal used largely in printing for making electrotypes, for coating letters known as copper-faced type, for mixture with lead, tin and antimony as a material with which types can be cast, and in the solid form for engraving or etching upon. It is a heavy, tough and durable metal, having a specific gravity of 8.8. It is known to chemists by the mark Cu, derived from its Latin name, cuprum. The alchemists called it

Venus. It has a characteristic red color. It enters into many compounds, such as bronze, brass and bell metal.

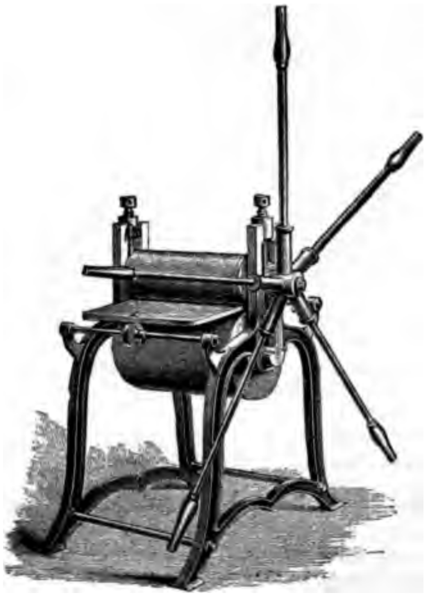
Copper Bronze.—A bronze powder made of copper which is used for printing purposes.

Copperfacing.—A method of covering by electric action new type fresh from the foundry with a thin coating of copper, so that it will wear longer. If well done there can be no doubt that the durability of the type is doubled. Its introduction is owing to the exertions of the late Samuel Orchard of New York, who saw its possibilities and experimented with it nearly forty years ago. The two largest composing-rooms in New York also use it to distinguish a new face from an old one. If the first is bare-faced the second is coppered, and when that is worn out bare-faced type is again used.

Copperplate Engraving.—Engraving upon copper, incisions being made and filled with ink, the plate then being subjected to pressure in a rolling-press. Except for etchings, this is nearly done away with, steel-engravings, which are made in the same manner, lasting much longer. See ENGRAVING, STEEL.

Copperplate Paper.—A paper usually made from the best stock, which is unsized. It is calendered on one side and uncalendered on the other.

Copperplate Printing.—Impressions taken with a rolling-press. The ink is placed in the incised lines, the remainder of the plate is rubbed off, and the sheet, previously moistened, is run through between two rollers, substantially similar to the way in which any piece of cloth is passed through a clothes-wringer. See PLATE PRINTING.



COPPERPLATE PRESS.

Coptic.—The language spoken by the inhabitants of Egypt since the introduction of the Christian religion. There is not a large literature. The language is not a highly inflected one. For instance, there are no variations of case. There are thirty-two letters, formed evidently from the same basis as the Greek. The stops used are one or two points, · :, but two points are most commonly employed. The mark used to divide the verses is +. The accent (ʻ) is employed. Some Coptic words are abbreviated by a line or lines above them. The letters, with their significations, names and equivalents, are as given in the next column.

Name.	Character.	Corresponding English sound.	Number.
Alpha	Ⲁ ⲁ	a	1
Beta	Ⲃ ⲃ	b { as v between two vowels }	2
Gamma	Ⲅ ⲅ	g	3
Delta	Ⲇ ⲇ	d	4
Ei	Ⲉ ⲉ	e short	5
So	Ⲋ ⲋ	ç	6
Zeta	Ⲍ ⲍ	z	7
Heta	Ⲏ ⲏ	e long	8
Theta	Ⲑ ⲑ	th	9
Iota	Ⲓ ⲓ	i	10
Kappa	Ⲕ ⲕ	k	20
Lauda	Ⲗ ⲗ	l	30
Mi	Ⲙ ⲙ	m	40
Ni	Ⲛ ⲛ	n	50
Xi	Ⲝ ⲝ	x	60
Ou	Ⲟ ⲟ	o short	70
Pi	Ⲡ ⲡ	p	80
Ro	Ⲣ ⲣ	r	100
Sima	Ⲥ ⲥ	s	200
Tau	Ⲧ ⲧ	t	300
Hu	Ⲩ ⲩ	u	400
Phi	Ⲫ ⲫ	ph	500
Chi	Ⲭ ⲭ	ch	600
Psi	Ⲯ ⲯ	ps	700
Ou	Ⲱ ⲱ	o long	800
Shei	Ϣ ϣ	sh	900
Fei	Ϥ ϥ	f	90
Hei	Ϧ ϧ	kh	
Hora	Ϩ ϩ	h	
Gangia	Ϫ ϫ	g, and j before a vowel	
Sima	Ϭ ϭ	sh	
Tei	Ϯ ϯ	ti, di or th	

COPTIC ALPHABET.

Type in the Coptic language was possessed by the press of the Propaganda at Rome in 1636, and was used there in that year.

Copy.—1. The words which are to be placed in type by the compositor. Three kinds are known, manuscript, typewritten and reprint. Each is given out to the workmen in small quantities, excepting in cases where a book is not to be torn apart and the whole is placed in the hands of one man. If it is reprint he receives a leaf or two at once; if it is manuscript a few pages. If the author supplies it in small quantities at a time it is usually handed to the compositors as received. On daily newspapers the usual takes at beginning work are such as will occupy compositors about an hour; later they are diminished to half an hour, and towards the close to five or ten minutes. In getting up works with expedition the takes should always be small, as then the galleys can be closed up and proofs taken without waiting, and the proof-reader and make-up need not be far behind. Where it is possible, copy in a book or job office should always be kept locked up in a safe. As it is rare for an author to have a duplicate, the loss of the manuscript would be irretrievable; it is also very necessary to be careful of the copy of new editions in which the author or editor has made alterations; of all posthumous manuscript works, and of unique copies, which sometimes are intrusted to the printer, the loss or destruction of which would be an unpardonable offense, unless it had been shown that all human precautions had been undertaken for their preservation. There should be a drawer in the frame at which the compositor works, or at its side, where copy can be put each night.

The sheets of manuscript of the Century Dictionary were photographed, so that in case of necessity the originals could be referred to and fire would not destroy the whole. Each sheet, which was of brown paper, was 8 by 12 inches in size, but was reduced so that it was only 1¾ by 2¼ inches, every letter being distinct under the magnifying glass.

Copy for a book should all be written with ink on one side of a paper of uniform size, so that it can be put away conveniently. It is not necessary to use letter-paper or any hard-sized paper; that with very moderate sizing will answer just as well. If well known the author can usually obtain what he wants from his printer; if unknown, by purchase from any printer in the neighborhood. The common size of book-paper is 24 by 38, which can be cut up into eighths, twelfths or sixteenths. In preparation, the sheets which have very many interlineations and alterations should be copied anew and the old ones thrown away. When the printer receives the copy he should note it in his memorandum-book and renumber it, never trusting to the numbering of the author. The entry will read thus: "Dec. 12.—Urquhart's History of the London Police, pp. 477 to 843." If it is to be kept for some time before being used a neat cover should be put on it, and it should then be deposited in the safe. Before being given out it should be carefully looked over; paragraphs that are to be run in and fresh ones that are to be made noted; the size of type for extracts, notes, and so on, indicated and the style of headings given. All copy is supposed to follow the rule of the office as to capitalizing and punctuation, and consequently these need not be indicated; but if the author or publisher wishes any other style followed it should be marked clearly in the beginning. Sheets of paper should not be too large, as they cover too much of the upper case, nor too small, as they do not contain enough matter. When a valuable book is to be reprinted a cover should be made for its outside and a shifting cover for the inside, while the weight which holds it apart should also be covered with clean paper every day. Copy on daily newspapers which has been used is put away every night, each one of the proof-readers attending to this in turn. The sheets are made up into a convenient package, which is then marked with the date. In book offices it is put away from time to time.

Manuscript works occasion a great deal more trouble than reprint ones. It is not so easy to see errors in manuscript as in type, and many things are only discovered when the proof comes. In foreign words each letter should be made separately, as well as all English proper nouns which are different from common usage, as Jedidiah Morse, Mathew Carey, Johns Hopkins, as they might very easily be printed Jedediah Morse, Matthew Carey, John Hopkins. Care should be taken to distinguish u from n, m from ni or ne, in from en, c from e, l from t, a from o, re from n, cl from d, r from v, and in fact much pains should be taken in the preparation of manuscript. The chief fault in writing comes from the hand not moving along at the rate of speed necessary to give the letters their due proportion. An expanded handwriting, to borrow a word from the art of printing, is rarely illegible. Some authors are very careful in respect to penmanship. The chirography of the late Bayard Taylor may be mentioned as an instance. Crapelet gives an account of a book in four volumes which he printed in 1826. It was the Memoirs of Count Michel Oginski, formerly grand treasurer of Poland. It was beautifully written. The compositors had never seen anything so fine. Each letter was formed as it would be by an engraver. In the course of the memoirs over four hundred Polish and Russian proper names occurred. Believing that French compositors would not be able to get these right, except with extraordinary care, the editor had all these peculiar names printed on a slip, a copy of which was given to each hand. It may readily be conceived that this was a great assistance for the compositors when they met with such names as Siestrzencewicz-Bohusz, Woyciechwski and Trzecieski.

Some authors maintain that it is not to their advantage to take pains in the writing of their copy, as if it is first rate it will be put into the hands of apprentices and common workmen, and they will be sure to get bad proofs. On the contrary, a bad manuscript must be put into the hands of excellent workmen, who will always produce good results. It is unnecessary to say that this is untrue. Should this theory be carried out the well-informed journeymen would always have the difficult work, thereby earning less money, while the poor workman would always have easy work and thereby make maximum bills. A fine would thus be put upon each man who learns his trade thoroughly. Master printers should charge an extra price for illegible copy, or if very bad refuse to take it unless they can employ men by the week upon it. All well-considered scales make a difference between the price of manuscript and reprint in the payment of compositors, simply on account of the difficulty of setting manuscript, the trouble with proofs and the slow return from the author.

The recent introduction of the typewriter has been of great value in printing. It is much more legible than the best handwriting, more words can be put upon a page, and it is easy to punctuate, capitalize and verify. The ordinary rate in New York for copying book manuscript upon the typewriter is fifty cents a thousand words, or about seventeen cents a thousand ems, while corrections upon proofs frequently amount to two, three or four times as much. It must thus frequently be an object for authors and publishers to have manuscript books typewritten.

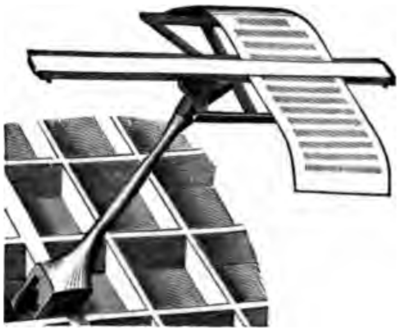
2. An example or single specimen of a book.

Copy-Board.—In England, the place where copy which has been set is put by the compositor. It is taken up and assorted by a boy. In some daily newspaper offices this is done in the same way here.

Copy-Cutter.—The assistant to the foreman of a daily newspaper who is charged with the preparation of the copy for the compositors. In small offices copy is cut by the foreman, but in large ones it takes a man's whole time, and the position is a very important one. The copy-cutter receives the copy from the editorial rooms, and, according to his instructions from the editor or his knowledge of the customs of the paper, proceeds to mark the size of type appropriate for each article, with the style of head, and whether solid or leaded, and then divides the articles into the proper sized takes, placing them on the hook. They are in all kinds of handwriting, and to decipher them is frequently an affair of much difficulty. Certain matter takes precedence of other copy, and consequently that which has been carefully gone over must frequently be held back when a more important "story" comes in. An ordinary large daily in New York or Chicago gives out from fifteen hundred to three thousand takes in one day, these sometimes being required at the rate of eight or ten a minute, and this labor, therefore, requires much skill and expertness. The copy-cutter also knows how much has been composed and how the copy is running.

Copy-Desk.—The table or desk at which the foreman or his assistant charged with the giving out of copy sits. In many newspaper offices and in nearly all book offices copy is given to the compositor there, and he does not take it from the hook. Generally speaking, too, the time record and bogus record are kept there.

Copy-Holders.—1. Those who hold the copy for proof-readers and read it to them. To do this well requires much experience. In most places this labor is performed by boys, but in many of the larger offices throughout the Union girls or young women are thus employed. They have usually better educations than boys, and if properly trained become very valuable. They are, too, less expensive than men would be. On large daily newspapers in America the copy-holders are men who are skilled proof-readers. A man changes with his companion at each galley, one reading aloud while the other follows. By this plan the voice is saved and the eyes become less fatigued. To read without a copy-holder is known as "horsing it." In ordinary book and weekly newspaper offices a great deal is thus read. In France this is the usual plan. 2. The guide or piece of metal or wood that holds the copy in place.



COPY-HOLDER.

Copy-Hook.—The hook upon which copy is hung in newspaper offices. It is the ordinary sharp filing-hook furnished by stationers and used by commercial men. There is usually one hook for each size of type, four or five at the most, and the copy goes out in a certain definite order in each place.

Copy-Money.—In olden times each compositor received a copy of the work he had been employed on or a pecuniary reward instead of it. The custom is now obsolete.

Copying-Paper.—A thin paper, made of rag or manila stock, used in commercial circles for copying letters and accounts. It is either bound up in books, between the leaves of which the letter to be copied is placed, or is in rolls which are submitted to hard pressure.

Copying-Press.—A machine for taking, by pressure, an exact copy of any manuscript recently written. A peculiar ink is generally required.

Copying Printing-Ink.—An ink used in printing from which a copy can be obtained in a letter-book.

Copyright.—The right of an author or those who acquire authority from him to the exclusive publication of a literary work. It is believed by those who have studied the subject most deeply that a man's natural right to his book is the same that he has to his horse, his clothes, his furniture or his house; but the State in all civilized countries has, for reasons of alleged public policy, taken away his property in perpetuity and given him instead a limited right, varying from fourteen years to fifty. Under the Greeks and Romans copyright was not known, and it is not believed that authors, with perhaps one or two exceptions, gained anything by their books except the applause of their contemporaries; nor was the condition of affairs materially altered until after the invention of printing, when the facility the art afforded for the multiplication of copies placed a single one in the hands of a reader at a price which before would have been impossible. Each improvement in type-founding, press-building and paper-making has reduced the cost. An ordinary duodecimo may contain sixty thousand words. At the lowest rate known to copyists in the United States, two cents a folio, it would cost to copy this duodecimo $12; at the ordinary rate of typewriters in New York city it would cost $30. But the printed volume can be afforded for a dollar or a dollar and a quarter and still give something in the way of remuneration to the author, which he would not have had in the former case. A number of the Century Magazine is sold for thirty-five cents, and contains 125,000 words. At four cents a folio a copy of this magazine would cost $50, without illustrations. Were the matter written by different authors for a single copy there would be no money for any of them, whereas now they receive a couple of thousand dollars for each number. It is evident that the profits arising from the sale of a large number of copies of a book would invariably tempt some persons to seize upon popular literary matter and reprint it, although unauthorized by the writer. Richardson, the novelist and printer, found that the Irish publishers of his day obtained proofs from his office surreptitiously and brought out his books almost as soon as he did himself. This was the course followed by American publishers towards British writers in the early part of the century, and this practice has been continued even till the present time. That one English publisher does not take from another, or that one American publisher does not take from another, depends chiefly upon the law of copyright, which, while limiting property to a term of years, makes it absolute as long as it lasts.

Those who hold that writers have no natural right to literary property base their support of a copyright enactment upon expediency. All good writing requires time for its production, and with much of it there is a great deal of expense. It is probable that the books and manuscripts gathered by George Bancroft for his History of the United States cost him over a hundred thousand dollars; fifty years were needed, and the labor of assistants was required for much of this time. Moreover, the volumes must be printed and bound, and when ready must be delivered to booksellers to be placed on sale, upon which, of course, the latter demanded a profit. Thus, then, the preparation of the work and its being placed before the public would require that readers enough should be obtained so that $600,000 might be received from them. The booksellers would not sell without a profit; the printer and binder must be paid, else the book could not be manufactured, and Mr. Bancroft could not have written the book as it was written if he had not had ample means of his own. Without copyright the means could not have been obtained; with it his wants were supplied. Had there been no copyright law Mr. Bancroft might have produced his first volume without having it seized by a new publisher; but the second volume would have been issued by some enterprising publisher in New York or Philadelphia within two weeks from the time a copy could have been found, and it would have been sold at a lower rate than the authorized edition. The publishers, therefore, instead of being able to give him two or three hundred thousand dollars for the work in his lifetime, would scarcely have been able to give him anything, and the work would undoubtedly have stopped half a century ago. Without the security afforded by the statute law everything which is of interest for more than a day or two would be reprinted. Its protection having been removed from Irving's earlier works and the earlier volumes of Bancroft, these are now out in unauthorized editions, as they would have been many years since if it had not been for the fear of the courts. A notable instance is that of Webster's Dictionary of 1847, now upon the market, under a title used until 1890 by the editors of the revised editions.

Those who object to an author's right to his book do so on the ground that it is a monopoly. A book is knowledge, but knowledge once given to the public cannot be withdrawn. The more public service it is the less right has the author to restrict its use to his friends or those who aid him pecuniarily. As well might Jenner have had a patent upon his preventive for the smallpox. Copyright is a monopoly and a mischievous form of protection. A very eminent English authority, Sir James Stephen, says that copyright at common law ceases at publication, because the general principle that a man has property in everything which he produces by intellectual labor, and can treat as an injury any use of it without his leave, would lead to absurd results. This would give a man copyright on his conversation. It would enable an author to prevent anyone from lending copies of his works to friends. It would make all the work of the human mind private property vested by the various chances of life in persons utterly unconnected with or very remotely connected with their author. But such a statement is untrue. The author does not claim a monopoly in any branch of literature. He simply claims it for the form in which he puts that part which he uses. If an author wrote a book upon the music of North American Indians, and it proved to be an interesting topic, although previously untouched, he could have no monopoly of it, but would doubtless soon see other authors entering upon the same field. They could not, however, copy his words. Half a dozen lives of Alexander Hamilton have been issued since the Civil War closed, each repeating the facts long since known. There are thirty lives of General Grant and more than a hundred histories of the United States, large and small. Yet none of the writers could have prohibited another writer from going to the same fountain head. The copyright is as to the form, not the ideas. The field is open to author or artist to cultivate what part of it he pleases, or for those who desire to compete with each other to cultivate the same part.

In the United States the law of 1831 gives to an author the exclusive right of publishing for twenty-eight years and a right of renewal to himself, his wife or children resident in the United States, for fourteen years more, making forty-two years in all. Until recently foreign authors could not obtain a copyright, but this has been changed by the act of Congress of March 3, 1891. They are there placed upon the same footing as native authors, the only condition required being that the printing must be done from type set in the United States or from plates made from type thus set. The contest for the right of foreign authors lasted for fifty-four years, having first been taken up by Henry Clay in 1837. See AUTHOR and LITERARY PROPERTY. The following are the essential portions of the present copyright law:

Section 1.—The author, inventor, designer or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print or photographic negative thereof, or of a painting, drawing, chromo, statue, statuary, and of models or designs intended to be perfected as works of the fine arts, and the executors, administrators or assigns of any such person shall, upon complying with the provisions of this chapter, have the sole liberty of printing, reprinting, publishing, completing, copying, executing, finishing and varying the same, and in the case of dramatic composition of publicly performing or representing it, or causing it to be performed or represented by others, and authors or their assigns shall have exclusive right to dramatize and translate any of their works for which copyright shall have been obtained under the laws of the United States.

Sec. 2.—The author, inventor or designer, if he be still living, or his widow or children, if he be dead, shall have the same exclusive right continued for the further term of fourteen years, upon recording the title of the work or description of the article so secured a second time and complying with all other regulations in regard to original copyright within six months before the expiration of the first term, and such person shall within two months from the date of said renewal cause a copy of the record thereof to be published in one or more newspapers printed in the United States for the space of four weeks.

Sec. 3.—No person shall be entitled to a copyright unless he shall, on or before the day of publication in this or any foreign country, deliver at the office of the Librarian of Congress, or deposit in the mail within the United States, addressed to the Librarian of Congress at Washington, D. C., a printed copy of the title of the book, map, chart, dramatic or musical composition, engraving, cut, print, photograph or chromo, or a description of the painting, drawing, statue, statuary or a model or design for a work of the fine arts, for which he desires a copyright, nor unless he shall also, not later than the day of the publication thereof in this or any foreign country, deliver at the office of the Librarian of Congress at Washington, D. C., or deposit in the mail within the United States, addressed to the Librarian of Congress at Washington, D. C., two copies of such copyright book, map, chart, dramatic or musical composition, engraving, chromo, cut, print or photograph, or in case of a painting, drawing, statue, statuary, model or design for a work of the fine arts, a photograph of same; provided, that in the case of a book, photograph, chromo or lithograph, the two copies of the same required to be delivered or deposited as above shall be printed from type set within the limits of the United States, or from plates made therefrom, or from negatives or drawings on stone made within the limits of the United States, or from transfers made therefrom. During the existence of such copyright the importation into the United States of any book, chromo, lithograph or photograph so copyrighted, or any edition or editions thereof, or any plates of the same not made from type set, or negatives or drawings on stone made within the limits of the United States, shall be, and it is hereby prohibited, except in the cases specified in paragraphs 512 to 516 inclusive in Section 2 of the act entitled "An act to reduce the revenue and equalize the duties on imports, and for other purposes," approved October 1, 1890; and except in the case of persons purchasing for use and not for sale, who import subject to the duty thereon not more than two copies of such book at any one time; and except in the case of newspapers and magazines not containing in whole or in part matter copyrighted under the provision of this act, unauthorized by the author, which are hereby exempted from prohibition of importation; provided, nevertheless, that in the cases of books in foreign languages of which only translations in English are copyrighted, the prohibition of importation shall apply only to the translation of the same, and the importation of the books in the original language shall be permitted.

Sec. 4.—The Librarian of Congress shall receive from the persons to whom the services designated are rendered the following fees: First, for recording the title or description of any copyright book or other article, fifty cents; second, for every copy under seal of such record actually given to the person claiming the copyright or his assigns, fifty cents; third, for recording and certifying an instrument of writing for the assignment of a copyright, one dollar; fourth, for every copy of an assignment, one dollar.

Sec. 5.—The proprietor of every copyright book or other article shall deliver at the office of the Librarian of Congress, or deposit in the mail, addressed to the Librarian of Congress at Washington, D. C., a copy of every subsequent edition wherein any substantial changes shall be made; provided, however, that the alterations, revisions and additions made to books by foreign authors, heretofore published, of which new editions shall appear subsequently to the taking effect of this act, shall be held and deemed capable of being copyrighted as above provided for in this act, unless they form a part of the series in course of publication at the time this act shall take effect.

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Sec. 7.—Every person who, after the recording of the title of any book and the depositing of two copies of such book, as provided by this act, shall, contrary to the provisions of this act, within the term limited, and without the consent of the proprietor of a copyright, first obtained in writing, signed in the presence of two or more witnesses, print, publish, dramatize, translate or import, or, knowing the same to be so printed, published, dramatized, translated or imported, shall sell or expose to sale any copy of such book shall forfeit every copy thereof to such proprietor, and shall also forfeit and pay such damages as may be recovered in a civil action by such proprietor in any court of competent jurisdiction.

Sec. 8.—If any person, after the recording of the title of any map, chart, dramatic or musical composition, print, cut, engraving or photograph or chromo, or of the description of any painting, drawing, statue, statuary, or model or design intended to be perfected and executed as a work of the fine arts as provided by this act, shall, within the time limited, contrary to the provisions of this act, and without the consent of the proprietor of the copyright first obtained in writing, signed in presence of two or more witnesses, engrave, etch, work, copy, print, publish, dramatize, translate or import either in whole or in part, or by varying the main design with intent to evade the law, or, knowing the same to be so printed, published, dramatized, translated or imported, shall sell or expose to sale any copy of such map or other article, as aforesaid, he shall forfeit to the proprietor all the plates on which the same shall be copied, and every sheet thereof either copied or printed, and shall further forfeit one dollar for every sheet of the same found in his possession, either printed, copied, published, imported or exposed for sale; and in case of a painting, statue or statuary, he shall forfeit ten dollars for every copy of the same in his possession or by him sold or exposed for sale; one-half thereof to the proprietor and the other half to the United States.

Sec. 9.—Every person who shall print or publish any manuscript whatever without the consent of the author or proprietor first obtained shall be liable to the author or proprietor for all damages occasioned by such injury.

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Sec. 11.—That for the purposes of this act each volume of a book in two or more volumes, when such volumes are published separately, and the first one shall not have been issued before this act shall take effect, and each number of a periodical shall be considered an independent publication subject to the form of copyrighting as above.

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Sec. 13.—That this act shall only apply to a citizen or subject of a foreign state or nation when such foreign state or nation permits to citizens of the United States of America the benefit of copyright on substantially the same basis as its own citizens, or when such foreign state or nation is a party to an international agreement which provides for reciprocity in the granting of copyright, by the terms of which agreement the United States of America may at its pleasure become a party to such an agreement. The existence of either of the conditions aforesaid shall be determined by the President of the United States by proclamation made from time to time as the purposes of this act may require.

The following explanations of the copyright law and of the procedures under it are made by the Librarian of Congress, Ainsworth R. Spofford:

1. A printed copy of the title of the book, map, chart, dramatic or musical composition, engraving, cut, print, photograph or chromo, for which copyright is desired, must be delivered to the Librarian of Congress or deposited in the mail, within the United States, prepaid, addressed Librarian of Congress, Washington, D. C. This must be done on or before day of publication in this or any foreign country.

The printed title required may be a copy of the title-page of such publications as have title-pages. In other cases the title must be printed expressly for copyright entry, with name of claimant of copyright. The style of type is immaterial, and the print of a typewriter will be accepted. But a separate title is required for each entry, and each title must be printed on paper as large as commercial note. The title of a periodical must include the date and number; and each number of a periodical requires a separate entry of copyright.

2. The legal fee for recording each copyright claim is fifty cents, and for a copy of this record (or certificate of copyright under seal of the office) an additional fee of fifty cents is required, making one dollar, in case certificate is wanted, which will be mailed as soon as reached in the records. In the case of publications produced by other than citizens or residents of the United States, the fee for recording title is one dollar, and fifty cents additional for a copy of the record.

3. Not later than the day of publication of each book or other article, in this country or abroad, two complete copies of the best edition issued must be delivered, to perfect the copyright, or deposited in the mail within the United States, addressed Librarian of Congress, Washington, D. C.

In the case of books, photographs, chromos or lithographs, the two copies deposited must be printed from type set or plates made in the United States, or from negatives or drawings on stone, or transfers therefrom, made within the United States. No copy is required to be deposited elsewhere.

The law requires one copy of each new edition wherein any substantial changes are made to be deposited with the Librarian of Congress.

4. No copyright is valid unless notice is given by inserting in every copy published, on the title-page or the page following, if it be a book; or if a map, chart, musical composition, print, cut, engraving, photograph, painting, drawing, chromo, statue, statuary or model or design intended to be perfected as a work of the fine arts, by inscribing upon some portion thereof, or on the substance on which the same is mounted, the following words, viz.: "Entered according to act of Congress, in the year ......, by ...., in the office of the Librarian of Congress, at Washington;" or, at the option of the person entering the copyright, the words: "Copyright, 18...., by ...."

5. The copyright law secures to authors or their assigns the exclusive right to translate or to dramatize their own works.

Since the phrase "all rights reserved" refers exclusively to the right to dramatize or to translate, it has no bearing upon any publications except original works, and will not be entered upon the record in other cases.

6. The original term of copyright runs for twenty-eight years. Within six months before the end of that time the author or designer, or his widow or children, may secure a renewal for the further term of fourteen years, making forty-two years in all. Applications for renewal must be accompanied by explicit statement of ownership, in the case of the author, or of relationship in the case of his heirs, and must state definitely the date and place of entry of the original copyright. Advertisement of renewal is to be made within two months of date of renewal certificate in some newspaper for four weeks.

7. The time within which any work entered for copyright may be issued from the press is not limited by any law or regulation, but the courts have held that it should take place within a reasonable time. A copyright may be secured for a projected work as well as for a completed one. But the law provides for no caveat or notice of interference—only for actual entry of title.

8. A copyright is assignable in law by any instrument of writing, and such assignment is to be recorded in the office of the Librarian of Congress within sixty days from its date. The fee for this record and certificate is one dollar, and for a certified copy of any record of assignment one dollar.

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10. In the case of books published in more than one volume, or of periodicals published in numbers, or of engravings, photographs or other articles published with variations, a copyright is to be entered for each volume or part of a book, or number of a periodical, or variety, as to style, title or inscription, of any other article. But a book published serially in a periodical, under the same general title, requires only one entry. To complete the copyright on such a work two copies of each serial part, as well as of the complete work (if published separately), should be deposited.

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14. Every applicant for a copyright should state distinctly the full name and residence of the claimant, and whether the right is claimed as author, designer or proprietor. No affidavit or witness to the application is required.

Copy's Out.—When the copy is all in hand, but not necessarily all composed, it is said to be "out."

Coquille (Fr.).—A kind of writing-paper having the mark of a bell; coquilles, literal errors, wrong letters.

Cording or **Corded Quires.**—The outside quires of a ream, generally marked with the ropes or cords with which they were tied.

Cores.—1. Metal stereotype blocks cast in girder-like sections to reduce the weight of the form and to economize metal. 2. The centres or wooden and metal parts of composition rollers.

Corner Irons.—The pieces of iron screwed on the corners of the bed or coffin of a press.

Corner Up.—A sheet when doubled up at the corners is said to be cornered up.

Cornering-Machine.—A machine for cutting the corners of books and cards. It is similar in theory to a paper-cutting machine, but is provided with blades of various shapes, so that corners can be made in a number of different styles.

Corners.—1. In printing, the metal pieces at the extremities of pages with which brass rule is joined. 2. In bookbinding, the leather or stiff material covering the corners of half-bound books. 3. The triangular tools used by a binder in finishing books and sides. 4. The metal ornaments placed on certain styles of books and albums, usually of the same pattern as the clasps used thereon.

Corps des Lettres (Fr.).—The body of a type; its size. Thus Cicéro is of corps 12.

Correct.—To alter the type in a form or galley so that it will conform to the proof. See Proof-Reading. This expression was formerly in general use to denote proof-reading itself, and still is somewhat used in that sense in England.

Correcting.—As used in America, the changing of wrong letters in the form or on the galley or making other alterations in the metal. As used in England it may have the meaning given above or the meaning of proof-reading. Correcting is best done on the galley. Upon this the type has been put when set, and upon it the proof was taken. The compositor places the galley on the stand next to his own, loosens the quoins somewhat, and lifts with his fingers the line in which a correction is to be made. If the change is of a single letter for another of the same size the wrong letter is taken out and the correct one put in without removing the line from the galley. If it is one in which there is more variation than this the line should be lifted out and placed in the stick, thus insuring absolutely good justification. Many compositors, however, trust to their eyes when the alteration is inconsiderable. If there are many changes, and the galley has been much loosened, care ought to be taken to see that the type is squarely on its feet before it is passed up to be revised. No wider or thinner spacing is allowable in corrections than was originally permitted. Bad letters when taken out should be broken and thrown into the old-metal box. In newspaper offices the man who has the first error takes up the galley and corrects till he reaches some one else who has four errors, and he then passes the galley to that person. The recipient corrects till he reaches another man with four errors, when this is repeated. Each man as he corrects draws a line lengthwise of the galley-proof at the margin to show that it has been corrected so far. He also pulls out the numbering slugs and closes the matter up. The last man carries the galley and its proof, quoined in at one side, to the place appointed, where it is proved by the galley-man. In some offices one error carries the revise and in others four errors are necessary, as in the first proof.

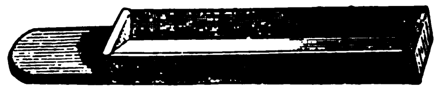
In old-fashioned book offices correction was formerly generally done on the stone. Three difficulties in particular arose from this. The compositor was nearly always at some distance from his stand, and was obliged to go there for his new letters and his spaces, as very few ever took the lines back to the case in their sticks. To reduce this labor to a minimum three, four and five em spaces, with en quadrats, were each put up in a little piece of twisted paper, and taken over to the form, besides the letters which were needful for the corrections. These letters were placed in a spare stick, the one set to the measure being reserved for the cases where a considerable change was required and it was necessary to take up a line. By beginning with the last error of his take the compositor could set up each letter marked in his proof, the first one corrected being the last he had set, and when the whole was done and carried over to the stone no return to the case would be necessary unless for a large out. It is unnecessary to point out that the work must be more awkwardly done in this way than it would be if the case were used. In all regular forms, too, the page next to the compositor is always upside down. He reads the words in that position with a good deal of difficulty, and when letters or spaces are substituted for others it must necessarily be done very slowly. A third objection to this plan is that, as the type stand perfectly upright in the form, having no support at the sides, they are liable to fall down if solid when a few letters are extracted, and it is very slow and tedious work to pick them up again. Even in leaded matter they may fall down sidewise.

To facilitate labor of this kind the bulk or table at the side of a frame is frequently used to put a form on in England. Its size, of course, cannot be great. In Germany a contrivance is used known as a correcting-stool. It is an ordinary strong stool, square at the top, and upon it is placed the letter-board and form. Throughout the whole of Europe a correcting-tray is more or less used. It consists of a flat receptacle, of metal or wood, divided into several little boxes, each containing a particular space or letter. In Germany a correcting-stick is used. It is of wood, of the ordinary form, but with an incline from the back to the front, so that when placed on the form the letters will have no tendency to fall down, but will retain their position.

CORRECTING-STOOL.

To extricate letters from the form a bodkin or a pair of tweezers or nippers is employed in almost all countries. The former is inserted into the back of the letter, and by the motion of the hand, which is held stiffly, the letter is raised till it can be caught by the fingers of the other hand. It is not necessary to obtain leverage upon the next letter. The tweezers or pincers catch the letters squarely and raise them perpendicularly.

Neither tweezers nor bodkins are much used in the United States; first, because they are unnecessary in correcting upon a galley; and, secondly, because from their slipping and scratching they do a great deal of injury. While an expert may not injure a letter a week, a common workman will spoil two or three dozen in an hour. There are in the United States many workmen on books who have never used either. The system of proving on galleys saves the cleanest compositors half an hour a day, and those who are less expert even more time.


CORRECTING-STICK.

Correcting in the Metal.—In England, the mechanical correction of a proof, in contradistinction to reading of the proof.

Correcting-Nippers.—A pair of tweezers used for correcting type.—*Jacobi.*

Correcting-Stone.—The surface on which a form is laid to be corrected, otherwise an imposing-stone. It is occasionally thus called in England.

Correcting-Tray.—In England, a tray or number of type boxes filled with spaces which are taken to the imposing-stone by the compositor when correcting his proof.

Corrections.—The errors or alterations marked in a proof; also, in England, the letters which are carried over to the form to make the necessary changes.

Corrector of the Press.—A term formerly used for a proof-reader, and recently revived by the association of London proof-readers, who entitle themselves the London Association of Correctors of the Press. See PROOF-READING.

Correctur (Ger.).—Proof.

Correcturbogen (Ger.).—Proof-sheets.

Correttore (Ital.).—A proof-reader.

Correzione (Ital.).—The marks upon a proof.

Corrigée (Fr.).—Corrected.

Corrigenda (Lat.).—Corrections; in the singular, corrigendum.

Coscienza, Uomo di (Ital., man of conscience).—A hand employed by the week; an office hand.

Cost of Production.—This very important question lies at the foundation of any successful attempt to carry on the printing business, for unless the actual cost is known it is impossible to tell what to charge in order to secure sufficient remuneration and at the same time not drive away customers. If high charges are made, and the public can get just as good work done elsewhere at less money, the cheaper office will have the business, while the dearer one will lie idle. There is no occupation in which there is likely to be a greater chance of error, and there are few in which the proprietors have been less trained in bookkeeping and buying and selling. The distinguishing feature of a good printer is his knowledge of his art, and he may be very distinguished for his skill in it while at the same time he has little more practical ability in business than a child. It is necessary that he should unite both qualifications, that of a printer and of a man of affairs, to conduct his calling successfully.

All charges in business are direct or indirect. Direct charges are those that can be seen and estimated at once, as the purchase of corn by a farmer to feed to his stock, or by a butcher of meat to sell again. Indirect charges are those which must be computed with the direct ones in order to ascertain whether the business is paying, but which are frequently so difficult of perception that a special scrutiny is required in order to place them in their proper position. Thus a farmer charges for the salt his cattle are supplied with, although the amount is small; but he is not apt to estimate against them the rent of the barns in which their food for winter is stored, nor the stables in which they are kept. Yet if he were in Texas, where no housing is required and no dry fodder is provided, he would be able to see that his cattle cost him less than in New York. So the butcher might count the expense of the paper that he puts around his meat and the wages of his journeymen, cashier and boys; but he might not calculate his rent or the deterioration of his tools and the interest on the good-will he had paid for. These charges, direct and indirect, are divided into three classes—the wages and salaries, the material consumed with production, and the expenses that do not increase or diminish with greater or less out-turn. The latter are known as fixed charges, and whatever they may be they must be added to the other charges in order to ascertain the cost of production. In them are included rent, fire, gas, insurance, repairs and a number of other things. They will amount in different places and different times to from fifteen to forty cents on each dollar of the other expenses. If they are neglected, as they would be if in printing only the actual cost of the paper, ink, composition and pressman's time were thought of, the business will be carried on at a heavy loss.

In estimating the cost in a composing-room it will be noticed at once that there are two classes of labor, the compositor and those whom it takes to complete his work. When his galley is up and it is proved the proof passes into the proof-room, where it takes a portion of the time of the reader and his boy. When it is corrected and again goes in it takes a little more of the reader's time, and then a part of the time of the make-up. Probably it again reaches the reader. Before it was set it was taken by the foreman and numbered and divided, and he most likely has had something to do with it afterwards. He sees it last when a press-sheet comes to him. Certainly to the ten hours of the compositor there have been added two and a half or three, perhaps even four, of work by others. To ascertain, therefore, what composition has cost in that room that day all the wages paid out there should be added together and divided by the number of thousands set. If it is job-work, which is not estimated by thousands, the wages of all those employed upon it, the foreman, proof-readers and boys, should be added together and divided by the number of hours. In either of these two cases the result is likely to be somewhat startling. If composition is paid for at forty cents a thousand it will usually be found to have reached sixty cents before it is complete; if the price per hour to the workmen is thirty cents, the cost will be from fifty to sixty cents. But to find what the true cost of the thousand ems is the calculation must be pursued still further. There are twenty thousand pounds of type perhaps in such a room, which, with the frames, galleys, leads, racks, stones, and so on, are worth $18,000. The interest on that for a year would be $1,080; the wear and tear, estimating it at nine years' purchase, which is too much, would be $2,000. These two sums would be, if there were three hundred working days in the year, $10.27 a day. Suppose there had been 100,000 ems set that day, the cost of interest and wear and tear would be over ten cents a thousand. A composing-room as large as this cannot be rented for a song, and it must be heated and furnished with light and water. As the counting-room has some general expenses that belong to the whole establishment, a part of them must be subtracted and added to the compositor's charge. It may be over one-half of the whole; it cannot be much less. The other charges that can be made to the customer are very few. They are materials, such as paper or cards; outside bills, such as ruling, binding or wood-engraving, on which custom allows only a very moderate profit, not more than 5 or 10 per cent.; presswork and boxing and carting. The last is not usually made. Consequently the expenses of the counting-room must be distributed among the things that can be charged for, and such expenses swell up the cost. In the counting-room it is necessary to write letters and buy postage-stamps; books of account must be purchased, telegraphic dispatches must be paid for, as well as railway fares, and there are also the salaries of clerks, the wages of errand-boys and the numerous miscellaneous expenses of the place. In addition to the interest on the type, presses and stock in the house it is necessary to provide at least two months' more capital, so that there shall be money enough to go on with until the customers have paid for their work. A share of all this goes to the composing-room, and is a just charge against every thousand ems of type set. For if these facilities did not exist the composing-room could not continue work; it would not have the accommodations for receiving and delivering orders and collecting bills. Many master printers deceive themselves in thinking that there can be some saving effected on this portion of the outgoes, and they believe that the great offices are eaten up by a score of expenses which could just as well be avoided. A printer beginning business is himself, generally speaking, a workman of more than average ability. He reads his proof at home and there keeps his accounts, and he is sure that these costs do not apply to him. But if he estimated his time during the day at its real value, say a third over the average, and counted on the hours spent at home, he would find that what profits he had made came chiefly from his own labor and not from the work done by others. He would be surprised, too, if he should calculate the rent, insurance and heat against each thousand ems set, and the number of bills he was obliged to leave outstanding. He probably would find that if he were doing a business of $6,000 a year there would be $1,000 out uncollected nearly all the time. Careful computations, measuring everything, would show that the results in his case are the same as in the larger offices.

The next department is the pressroom. Labor here increases or diminishes very much according to the work performed, as do the paper and ink; but the presses represent just as much value in July, when they are idle, as they do in November, when they are going at their greatest speed. The room is of the same size, and the engine must be fired up for one or two presses just as it would be for a dozen. The foreman is there, and so are some of the workmen. Expenses are then lessened, but not so much as receipts are. Printers rarely charge enough for their presswork. They estimate their bills upon what the machines will do under favorable circumstances, and forget that there are months when only half work is done, and that the performance of a press is very different on a hundred thousand run, on satisfactory paper, from what it is on the ordinary short order, with perhaps inferior paper or plated paper, or with bad process cuts in the forms. Some good printers in New York assert that their presses will not average four thousand a day, although they have the best machines and good pressmen. Their work will not admit of it. It is evident, therefore, that such establishments must revise all previous theories about performance, and especially need to watch what is done. The cost cannot be told if all the presses are esteemed to be worth the same, nor in case no allowance is made for ink. Each press should be individualized and should have an account kept with it. The pony cylinder is not worth as much as a double-medium, nor that as a 38 by 48. To divide these accounts properly each press should be named, say, A, B, C, D and so on, those of like size being grouped together in the book. An accurate account should be kept of the number of impressions made, as well as of the hours in making ready and the length of time stopped for alterations or the like. These hours must be put in at a higher rate than what is received by the pressman and feeder. If the time of a press is worth ten dollars a day, then the two hours required to make ready a certain form should be estimated at a dollar each, and not at fifty or sixty cents. But if charges to the customer are regulated upon the number of tokens, say forty cents each, a small order of eight or ten tokens will not cover the loss of time incurred in making ready, and a special charge on this should be included. Thus there are two charges, one for impressions and one for make-ready; stoppages for the publishers should be a third, and ink the fourth. The last item is unusual, but an examination of the books of Matthews, Northrup & Co. of Buffalo, who keep them thus, shows its utility, if correct accounts are desirable. There are sheets which require only half a pound of thirty-cent ink for a thousand impressions; there are others that for the same number take three pounds of ink worth a dollar and a half each. Ought these to be on an equality as regards charges? On the ticket of each pressman he should fill up each day the performance of each of his presses and the quantity of ink used as nearly as he can tell. On the foreman's book this is entered twice, both as in a day-book and in a ledger, the former to tell what has been done on that day and the latter to tell what a press does in a month or a year. The foreman can correct any error as to the quantity of ink, for he knows how much has gone out and how much remains; but by putting against each press the name of the pressman, the feeder, the different jobs, the number of impressions, the hours of stoppage, the time of make-ready and the value of the ink, it is easy enough to summarize the cost and performance of the machine for a month or for any other time. In the accounts in the counting-room rent should be charged against each press according to floor space, and power according to size. Thus, if the room has 5,000 square feet and has twelve presses, varying from the largest to the smallest, it would be unjust to the pony cylinder to tax it as heavily as the mammoth. One press should perhaps pay for 600 feet, and another only for 250. A similar allowance must be made on horse-power. All the power is not used up in the pressroom, and what is used outside of the pressroom should be charged against the other departments. There are a freight elevator and a couple of cutting-machines on the counting-room floor, and the building is heated by steam.

A similar rule about division applies in the bindery, if there is one. It needs power and heat, it must be insured, it has machinery that will become valueless in time, and much is used up every week in leather, glue, gold and other things. Labor is, however, usually the largest charge. Figures should be so kept here that it might be possible to ascertain what the binding of 2,000 Fox's Book of Martyrs cost, so as to compare it with the sum estimated, and so with every other thing done. The ticket system, elsewhere described, is a great help in this. No printing-office and no bookbindery ought to do work for bare cost, and to know what to charge those in the counting-room who check performance should be able to look at the record of a previous book somewhat similar and see whether the limit of cost to charges proposed was exceeded and why. This will give them the basis for making a more correct charge for the next estimate. An examination will sometimes show, when the question of getting an order depends upon the price, where it is expedient to fall. Every printer and binder should have a certain gross profit on his estimates below which he will not descend—not so great on some kinds of work as on others, but sufficient. He cannot get as good prices on bill-heads, for instance, as he can on some other classes of work; but having established a ratio between the cost and the bill he should not vary. Rather let the work go away. The last of the productive departments is the warehouse and delivery, but this is so only in a very limited sense. The bills for packing, boxing and cutting amount to very little.

The counting-room brings together all these costs and adds to them the general charges of the business. There are the manager and the bookkeeper; there are the clerks, the cost of correspondence, traveling expenses, subscriptions and charities, and there all the expenses, such as rent and insurance, come in the first place. This department earns nothing and makes no charges on its own account, but collects those of the composing-room, electrotype-room, if there is one, bindery, pressroom and warehouse, and adds them together, with a loading, in order to make out its bill. The ratio of expense here varies much. There are two offices of similar size in a certain city in which one costs twice as much as the other in this respect. The most expensive one has many estimates and its orders are small in proportion to those of the other. In an office kept as it should be the general expenses need not go on the books of each department, but each of these books is drawn off from time to time and added to in the counting-room. The fuller and more complete they are the better the manager will know his business. This subject, the cost of production, has had very little written upon it except in the American Bookmaker. The earliest investigation of the matter was by Hansard, in his Typographia; De Vinne discussed it in some papers thirty years ago and has written about it since; but with these exceptions and the papers read before the St. Louis, New York and Cincinnati Typothetæs, and the United Typothetæ, there is really nothing to be found anywhere. The Cincinnati essay is the most complete one.

C. B. COTTRELL.

Cotton-Paper.—See PAPER.

Cotton-Waste.—Refuse cotton, used as wipings to clean machinery, &c.

Cottrell, Calvert B., the printing-press manufacturer, was born at Westerly, R. I., on August 21, 1821, and served his apprenticeship to the machinist's trade at Phœnix, in that State. In 1855 the Pawcatuck Manufacturing Company of Westerly, iron-founders, built and leased to Mr. Cottrell and Nathan Babcock, under the firm-name of Cottrell & Babcock, a building adjoining their furnace, in which they began work as machinists. The Pawcatuck Company had purchased from Merwin Davis of New York the patents and right to manufacture an oscillating press invented by him which had been previously built at Hope Valley, R. I. This press Cottrell & Babcock first began to manufacture in July, 1856, and they shortly after began to make a polychromatic press, which sold extensively. In 1858 they made their first drum-cylinder press on the common pattern of that day. Their work, however, was chiefly in general machinery, and it was not till 1867 that presses were made the predominating feature. In that year an office was opened at No. 8 Spruce street, New York, which has ever since been retained by Mr. Cottrell. Mr. Babcock's interest was purchased in 1880, the business since having been conducted by Mr. Cottrell and his sons. The inventive genius shown by Mr. Cottrell has been of a high order, one of his later improvements being the front delivery.

Cottrell Presses.—A line of presses made at Westerly, R. I., comprising a lithographic press, a stop-cylinder, a two-revolution, a two-color, a job and newspaper and a Country press. Lately there has also been added a web press, automatically fed from a roll of paper, which has been put successfully into operation. Air-springs are applied to all the cylinder presses, thus lessening the jar of the press very much and diminishing the wear. Another improvement is the front sheet-delivery, the printed sheet being caught by grippers as soon as it is printed and carried rapidly forward upon light arches considerably above the bed of the press to the pile-table. A hinged roller-frame and a patent governor have also been brought out.

Couleurs (Fr.).—Colors.

Count, Short.—To deliver a short count is a serious error. It is no excuse to say, when a thousand copies of anything were ordered, that forty quires were printed, and that is a thousand. It is not a thousand unless that number can be counted in the delivered copies. The customer must know exactly what he is to get. In those cases where custom makes a short count, as blank-books, the deficiency should be pointed out when the order is given. Otherwise the quire must consist of twenty-four sheets.

Counter.—1. The person responsible for the proper counting of all work as it is printed off. 2. That part of the type which is at the side and within the lines which print, and thus leaves a white space. 3. A small machine which, when attached to printing-presses, indicates the number of impressions taken.

Counter-Proofs.—A method of obtaining a spurious impression of an engraving. As soon as the print comes from the press the counterfeiter lays another sheet of wet paper against it and runs both through the rolling-press. The off-set, as letter-press printers call it, is so great that a fair impression is obtained, the color coming off the one first printed and passing on to the other, but reversed. It can always be told if there is any lettering upon it by this alone, or it can be told by the reversing if the original has once been seen. The impression thus given is fainter than usual and there is so much difference that no expert collector can ever be thus deceived.

Counting Off Copy.—See Casting Off, another expression for the same thing.

Country Newspapers are usually understood to be those which are carried on in places having from one to ten thousand population, and appearing only once a week; but the term is also frequently used as applied to small dailies printed in little local centres, even if the population is considerably in excess of the number above mentioned. It does not apply to periodicals which circulate all over the United States, nor to such as yield a gross income of forty or fifty thousand dollars a year. The editor is a printer and business man as well, and he generally finds it necessary to work hard in all three of these departments. It is commonly supposed that the job-printing of a village is equal to a dollar annually for each of its population. Thus a fair allowance for Waterloo, N. Y., would be five thousand dollars, while for Lancaster, N. H., it might be about twelve hundred. A country paper can hardly obtain more than three thousand subscriptions, although there are one or two in the Union that double this, but it is likely in the West to fall below six hundred and in the East below a thousand. The weaker ones everywhere use patent insides. See Partly-Printed Newspapers and Plate Matter. They would not otherwise be able to compete with their neighbors and with the weeklies from the great cities. The advertising receipts are about equal to those from subscriptions. The account-books of a country newspaper are simple. They consist of a subscription-book, on which the number of the paper with which a subscription will expire is entered. This is not kept by dates, but by the whole number. For instance, John Jones comes in and pays his subscription for one year, or fifty-two numbers. The one with which he begins is 513. Consequently fifty-one is added to this, making it 564. He is therefore put down under his post-office address as "John Jones, 564." The next year, when he pays up, this is crossed out and fifty-two added, making it then read: "John Jones, 616." When he discontinues his name is crossed out; if he stops, still owing, that fact, with the amount and date of discontinuance, is there written in. His payments are entered in the cash-book with all other receipts, thus: "Sept. 27.—John Jones, Berlin, subscription, $2." On this cash-book all receipts of cash are entered, whatever they may be, as well as all entries in kind, as: "Oct. 18.—Henry Wetmore, two barrels of apples on account, $5." No price may have been mentioned, but some figure should be put down, even if a present. The job-book is kept just like any other job-book in a small establishment. It should have a particular description of the job and the amount charged, and it should be so detailed that it could be referred to afterwards to find out the sums paid out for paper, presswork, composition and all other expenses. When the accounts are settled that fact should be noted here as well as in the cash-book. Advertisements should be cut out of the paper upon their first appearance and pasted into a book like a scrap-book, with a memorandum against them giving the time for which they are to run, the charge, the orders as to position, and the day of expiration. One would read: "Jones's Pills, Jan. 17, six months, top column, next reading matter, notice to be inserted every four weeks in local, as per copy to be sent, half column, stereotype, $37. Cash after first insertion. Expires July 16." At the end of this book should be twelve pages, one for each month, in which these expirations can be entered together. They will thus appear:

July 9.—Farm of A. H. Henderson, Medina.
July 16.—Jones's Pills.
Dry Goods Slaughter at Warren's.
July 23.—Dog Lost.
Mortgage of Charles Topham.

Thus the establishment will not be carrying dead advertisements, and this book will be a reminder that the men are to be seen or written to for a renewal, which would sometimes be forgotten if the expirations were not thus noted. A convenient form for ascertaining just how much the office is earning will be shown under Newspaper Accounts. The cash-book above mentioned should contain the payments on the page opposite the receipts. Everything should be entered here. At the head of the page which contains the receipts should be entered the money left over from the previous page. To this is added all that has been received, the amount showing what should be on hand if nothing had been paid out. The footing of the opposite page will show what has been expended, and when subtracted from the total of the other will show the state of the cash account exactly. A ledger will be sufficient for the summarized account, without going through a journal. It is very difficult to get country editors to keep accounts, and if a number of books are prepared for this purpose the work will probably not be done. Those that are here mentioned are, however, necessary. These books, a cash-book, ledger, advertisement-book, subscription-book and job-book, will not cost over a dollar apiece on an average, and the time to keep them in an office receiving ten thousand dollars a year will not be over an hour a day. Letters that relate to business should be preserved and properly filed away, and there should be a safe.

In the printing-office no such expensive outfit is necessary as is found in the city. A Country cylinder press, a jobber or two, and a Washington hand-press would be a very good stock indeed. The village carpenter can make the trough for washing forms, the standing galleys and the frame for a stone. This necessary article can be bought from some stone-mason near by at a much less price than foundries would charge. Two sizes of type are enough for the weekly, say bourgeois and minion. A case of pica, one of great primer for hand-bills, three cases of small pica to set briefs, a case of brevier for job-work, and one of nonpareil for the same are sufficient for an ordinary office. Fifteen fonts of wood type and eighty of metal, some of them duplicated, will be necessary, but script will not be required.

Advertising is obtained by writing for it and by going to the advertisers. Leading men in this line should be visited frequently, and a memorandum kept of promises or of dates when a new call may be useful. If the business is large enough a drummer may be employed, who can also do the collecting. This should be very promptly attended to. Accounts are no more easily collected by waiting than by going for them at once. The advertiser does not feel grateful for forbearance. It will generally be found worth while to pay a couple of dollars a week to some one to gather up local matter. More can be given if the town is large or difficult to get around. Correspondents from country towns will generally feel remunerated if they receive a copy of the Century or Harper's each month, the postage on their letters being paid. The magazines should come to the office in a bundle and be distributed from it. If sent from New York the correspondent might become lax. It is difficult in a country paper to be independent of parties, and, as a matter of money, it is advisable to belong to one of them. Nor can the independent newspaper say anything upon politics without offending some of its readers, even if the remarks are just and expressed with moderation. If a newspaper reaches a circulation of a couple of thousands, and has a sufficient income, it is well to employ some one regularly in the preparation of local and other copy and in looking after the books. In New York and Pennsylvania some unemployed person can generally be found for this purpose at about ten dollars a week, and in the West at a couple of dollars less. A woman can do much in this way at a still more moderate compensation.

Country Press.—A cylinder press intended for general work in the country, and therefore less expensive and more simple than the elaborate machines used in cities. See PRESS.

Coup, le (Fr.).—The pull.

Couper (Fr.).—To cut.

Couplets, les (Fr.).—The joints of a tympan.

Coupoirs à Interlignes (Fr.).—Lead-cutters.

Court Envelopes.—Square envelopes to take large or small post octavo in half, and termed respectively large or small court envelopes.—*Jacobi.*

Court Hand.—A type made in 1700, which was a black-letter in its idea, but devoid of many of the angles of that character, so that it could be written more rapidly. It was a perpendicular type, with high ascenders and low descenders and difficult to read. The size was a double pica.

Courts, George M., a printer of Galveston, Tex., is a native of that State, having been born in Freestone County on August 4, 1853. His parents removed to Galveston in 1859, where they both died soon after. At the age of twelve years he entered the stationery house of Robinson & Co. as an office-boy, but though having only three years of schooling he was able soon to reach a responsible position in the house. For two years previous to 1879 he was managing the stationery department for the wholesale drug house of R. F. George, but in that year he entered into a partnership with Robert Clarke, as stationers and job-printers, with a joint capital of $5,000. It prospered, and was turned into a joint-stock company in 1887 under the title of Clarke & Courts, of which Mr. Courts is president. At the annual meeting of the United Typothetæ in 1890, held at Boston, he was elected a member of its executive committee.

GEORGE M. COURTS.

Couvrir (Fr.).—To cover.

Coventry.—To send a workman to Coventry was to refuse to speak or exchange information with him, or to help him in any way. It differs from boycotting, a much later term. Under the latter treatment injuries are inflicted; but in Coventry non-intercourse is alone attempted. A case has been known in New York within thirty-five years. The hands of a certain newspaper went on strike one afternoon, returning in about three hours. In the meantime one man had offered to go out and get fresh hands. Many of his associates never spoke to him again, although he had been employed with them for years, and otherwise he was not objectionable.

Covers.—The covers of pamphlets are usually printed on medium, 19 by 24 inches, and royal, 20 by 25 inches. Double cap, 17 by 28 inches, and super-royal, 22 by 28 inches, are also used. The best assortment of colors on fine papers may be had of the size 20 by 24 inches. There are many varieties of material. The page of type on a cover is usually considerably larger than that of a page in the body of a book, and if not a border is generally placed around it, commonly of brass rule. It is permissible to use ornamental type upon a cover, and it is not necessary to use as many words as on the inside title. Many of the unimportant ones are dropped. On the last page, if there is no copy, a border can be placed and in the centre an ornamental cut.

Cox Printing-Presses.—A series of presses manufactured at Battle Creek, Mich., comprising both web and ordinary cylinder presses. The web presses are a duplex, which delivers perfected, folded papers printed from the web on flat beds with ordinary type; a stereotype newspaper press, printing from the web on curved stereotype plates; a pony duplex, considerably smaller than the duplex, and a wrapping-paper press. The other presses are an art press (a stop-cylinder) and a front-delivery Country press.

Cramped.—When matter is set close and insufficiently whited out.—*Jacobi.*

Crampons, les (Fr.).—The iron cramps (of a hand-press).

Cramps.—Corner irons, used in the bed of a wooden hand-press to secure the chase and to strengthen the coffin.

Cran, le (Fr.).—The nick in type. In French printing-offices this is at the back.

Crane, George W., a printer and publisher of Topeka, Kan., was born in Easton, Pa., on August 25, 1843. He went to Canada, and while there was in school for five years. He served as an apprentice to the nursery and floral business until 1863, and then became a salesman in a general store until March, 1865, when he left for Kansas. After four years of market gardening in Topeka, in that State, he began the manufacture of blank-books and county supplies, and has continued in it ever since. In 1869 he helped to establish the Topeka Daily Commonwealth, and retained a third interest in it for two years. In 1874 he added printing to the business, and in 1879 began law-book publishing. His list embraces all of the Kansas law-books that are not published by the State, including the General Statutes of 1889. The business has been destroyed by fire three times, on each occasion inflicting heavy pecuniary losses beyond insurance. He carries on business as George W. Crane & Co., although there are no partners. He was actively concerned in the establishment of the Typothetæ in his city, and has served as a delegate to the annual conventions.

GEORGE W. CRANE.

Cranston Press.—A cylinder machine made at Norwich, Conn. The Commercial press is designed particularly for job-work. There are besides the Patent Improved, for general work; the Book and News, the Improved Newspaper, the Country and the two and four roller two-revolution. Each of these is in a variety of sizes, with all modern appliances.

Crapelet, father and son, two printers of France. The father, Charles, was born at Bourmont on November 13, 1762, established his printing-office in 1789, and died on October 19, 1809. He was called the French Baskerville. He endeavored to unite the greatest simplicity with elegance and to deliver the art of printing from the heterogeneous ornaments with which it was overloaded. His editions are no less correct than beautiful. He was successful in printing on parchment, and showed his skill by producing an impression on gold. G. A. Crapelet extended his father's business and even excelled him in elegance. His Lafontaine, Montesquieu, Rousseau and Voltaire are monuments of his taste, and the large vellum-paper copies are truly splendid works. The words "De l'imprimerie de Crapelet" were a great recommendation. The elder Crapelet in 1800 employed twenty-two presses. The junior published in the year 1837 a most valuable work upon printing, entitled Études Pratiques et Littéraires sur la Typographie.

Craske, Charles, a stereotyper of New York, was born in London, England, on February 22, 1822, and was educated in the well-known Blue-Coat School of that city. He came to America in 1837 in his sixteenth year, and learned the art of steel and copper engraving, which he carried on in New York for twenty-five years. In 1850 he introduced a new method of stereotyping, that by paper molds or matrixes. By this mode two important features were introduced, both of them new. One of them was that any number of plates could be made in rapid succession from the form, and the other was that, although the matrix was made flat, corresponding with the surface of a page, yet as it was flexible it could be placed in a casting-box of any desired curve and a plate obtained of that curve. In 1854 he stereotyped a page of the New York Herald, and in 1861 he began regularly to make plates for the Tribune. This proving successful, he shortly after made a contract for stereotyping the Sun, Times and Herald. The material used is a soft, wet and thick paper. The sheet is laid upon the form, beaten in with brushes, and then the form is put into a press where much power is applied. The page of type and the platen of the press are both heated, thus making the time for drying the matrix much shorter than it would be otherwise. When the sheet is taken off it is like a huge sheet of card-board, somewhat scorched in places, where the type or indentations are to be found and where the spaces or projections are seen. Since the time of the introduction of this method, now used everywhere, Mr. Craske has carried on the business of electrotyping and stereotyping in New York city, but has discontinued engraving.

CHARLES CRASKE.

Cream-Laid.—A writing-paper having a creamy tint with lines running through it at equidistant intervals, such lines being thin places caused by the pressure of wires fastened to the dandy roll, a wire cylinder on the paper-machine, under which the wet paper passes and by which it is pressed.

Cream-Wove.—A writing-paper in which no laid lines appear—the reverse of cream-laid.

Credit.—Work offered by an entire stranger without settled or known place of business should be paid for in advance. All kinds of election work, the publishing of a book or a newspaper, or the establishment of an invention or patent medicine are as full of hazard as any form of gambling. The party intending to reap the reward should take the whole risk and should be prepared from the outset to pay the loss. It will be found judicious to avoid all running accounts, and to secure at least monthly settlements with all customers. Cash should be the rule; credit the exception.—*De Vinne.*

Crenate (Ital.).—Kerned.

Creswick.—A hand-made drawing-paper, so called after a person of that name.

Crochet Type.—A small type used to form pages representing patterns of crochet work, many of which consist of pictures of flowers, animals, landscapes, &c. Each type is on an em body and has on it a little figure. By the contrasting of these the picture is made. See next page.

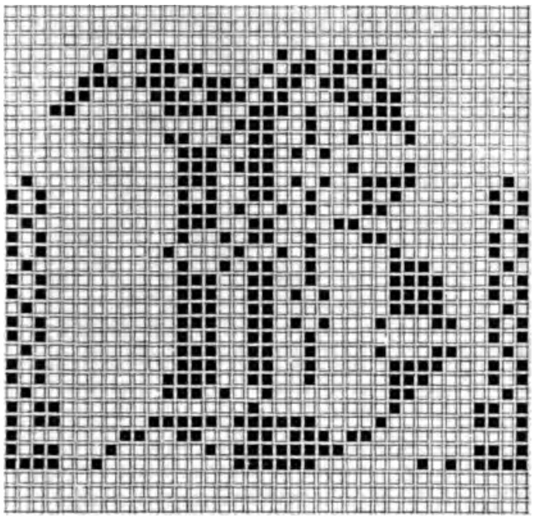
Cropped.—When a book has been cut down too much in binding it is said to be cropped.

Cropper Machine.—A jobbing-press made in England, a very close imitation of the Gordon press as manufactured in America.

Crossbars.—The bars which divide chases into sections or parts. They fit into slots or niches at the sides.

The bar which runs the long way of the chase is known as the long cross, and the one which goes the other way is the short cross.

Cross-Hatchings.—Lines in an engraving drawn or made across other lines, somewhat similar to a lattice.



CROCHET TYPE.

Crotchet.—1. A mark like the first of two brackets, but larger, thus: [. It is employed to indicate a new paragraph; but this use is uncommon in America, although descended from the early days of printing and even before. 2. Another name for a bracket.

Crowd.—The name given to a quarter or a fifth of the compositors who work on a daily paper, each crowd taking the early and late labor in turn. The word phalanx is much more used than crowd for this purpose.

Crowded.—When type is composed somewhat closely or cramped it is said to be crowded.—*Jacobi.*

Crown.—A size of printing-paper, the dimensions in England being 20 by 15 inches. American crown paper is 15 by 19 inches.

Crushed Levant Morocco.—Morocco, to which a slight pressure is applied after the book is in leather, sufficient to give the leather a smooth appearance, but without entirely obliterating the grain.

Cryptography.—A method of communicating intelligence by so writing or printing that if the paper shall happen to fall into the hands of third persons it will prove unintelligible. The substitution of one letter for another, as, for example, to take the third letter forward in the alphabet, is sufficient to prevent some persons from learning the purport of a message or an advertisement, but it is soon puzzled out. Take, for instance, a sentence like this: "Lw lv wkh hdvlhow wklqj lq wkh zruog wr zulwh d vhfuhw ohwwhu." The student of cryptograms would look upon this attentively a moment, and then make a guess that the small word of three letters that occurred twice before a larger word must be "the." If "wkh" is "the," then the first letter, or w, must stand for t. There is a word "wr" which stands before a larger one, just as a certain word would if this first letter were t. He guesses it is "to," which is by all odds the most common word with two letters which begins with t. He then has four letters. H means e, k means h, r means o, and w means t. Each of these is just two letters apart, further down the alphabet. Suppose this is tried on the first and second words, "Lw" becomes "it," "lv" "is," and the rest is unfolded at once: "It is the easiest thing in the world to write a secret letter." But transpositions do not usually yield themselves up so easily. If very short it may be impossible to decipher them; but if of the length of a hundred words or more they can generally be unraveled, although at considerable loss of time. A longer one is subjoined, that the method of transliteration may be shown:

"Zb vrw qwxzbbzbx ds rzivdjl ywb hznwu kfdb xjgzbi, szir gbn qwjjzwi, sdj vrwl rgu bd dvrwj sddu, gbu vrwl uzu bdv tkhvzngvw vrw xjdkbu ql edjazbx zv."

A close examination of this will show that there are three letters, w, z and b, that are more common than the rest. One of these must be e, for in an extract of this length the disproportion of e's to the other letters is sure to show itself. The w and z may be a, i, o, h, n, s, t or r. It is scarcely possible one of these can be any other letter. But a, i and o rarely end a word, nor does h end as many as it begins. There are two words which are much alike, vrw and vrwl. The vrw comes before larger words, which is the habit of "the." If we make a trial or guess with this, it will form the first three letters of another word, which must be "they." It should be noted that the translations of all cryptograms are founded in the first place upon successful guesses, based upon probabilities. If one does not prove upon trial to be correct, another must be ventured upon until the comparison of one word with another shows the conjecture to be correct. The blind words are carefully written out at this stage, with blank spaces beneath, and wherever v comes t is written below; where r comes h is written, where w comes e is written, and where l comes y is written. Other letters are added when discovered.

The sentence, as finally puzzled out, is:

"In the beginning of history men lived upon grains, fish and berries, for they had no other food, and they did not cultivate the soil by working it."

All cipher writings can be interpreted if there is a sufficient number of words. In some permutations figures are added and arbitrary marks; in others several characters express e or i or t. Sometimes an extra letter is added to small words so that they cannot be identified. There are many other plans besides that shown here. Perhaps as effectual a one is that adopted by the Knights of Labor in their strike on the New York Central Railroad in 1890. Each man had a dictionary, and the dispatch gave for each word the number of the page and the number of the word on the page, counting by lines. It is difficult, however, to get two uncommon dictionaries just alike. If Webster or Worcester or Stormonth is used the deciphering is very easy. Cipher has been very largely used by governments. In the records at Simancas, in Spain, the perfidy of the king three hundred years ago has recently been discovered. The key was lost until again made known by an industrious German. Pepys wrote his Diary in cipher, Burr his alleged treasonable letters in it, and Napier, the historian of the Peninsular War, records the assistance he derived from his wife in deciphering dispatches and other documents relating to military affairs which were thus written. The instance where the New York Tribune puzzled out the frauds in Oregon at the time Tilden was running for the Presidency cannot be forgotten.

The method of composition of such sentences as are here given is to set the principal line first. It is usually put in two sizes larger than the meaning, the cipher, for instance, being in brevier and the explanation in nonpareil. After setting a line of the text begin with the explanation. It may be much smaller, and in this case the nonpareil may be justified below the other word and directly in its centre, the remainder of the space being taken up with spaces and quadrats. If on the contrary it is too large, the brevier must be spaced out to match it. Considerable care is required to do this nicely.

Crystallotypy.—A method of producing crystallized tint plates.

Cul de Lampe (Fr.).—Tail-piece.

Cunabula or **Incunabula** (Lat.).—Cradle-prints or cradle-books; copies of books printed in the infancy of the art of printing, generally limited to productions of the fifteenth century, but sometimes extended to 1525. Another name for these is "fifteenthers."

Cunei (Ital.).—Quoins.

Cuneiform.—Wedge shaped; a term applied to the writing of the ancient Babylonians and Assyrians, the letters bearing a resemblance to a wedge.

Curly ñ.—A term for the accented letter n used in record work or in Spanish.

Curved Lines.—Much job-work is done in which it seems expedient to have curved lines of type or of rules, but a great deal of it is handled in such a way that it is certain that those who attempt it do not know how it should be proceeded with. There are several methods of curving brass rules, which can, of course, be done more certainly and more quickly than with the fingers; but rule twisters and curvers are not in every office, and a consideration of the theory of the curve should precede actually making one. Curves are of two kinds, concave and convex, and both can be united when it becomes necessary. A convex curve in printing has the farthest point in its circumference nearest to the top of the page, and a concave one farthest from the top. They are in reality the same thing, viewed from a different standpoint. The simplest curve made is a single line running across a page. This is set up on a galley, a side-stick being placed against the matter to give the side pressure. Two leads of exactly equal length are provided. Supposing the measure is sixteen ems pica long, the leads must then be of enough greater length to allow for the curvature. If that should be one em, a pica em quadrat is placed in the centre, and small pica, long primer, bourgeois, brevier and the other descending sizes might be placed against it at each side, so that the matter could be tapered off. But this is not necessary. An em taken out of sixteen leaves fifteen, and half of this is seven and a half. It is therefore better to fill in with broken leads, putting in five, four, three or one, as the case may be. These come between the curved leads and the line which follows next after. In curves of greater size the gradation of quadrats is valuable, as it serves to determine exactly the degree to which the leads are bent. The bending is done with the fingers. Above the convex line the process of filling in is repeated, the greatest amount, however, being at the end, and the least towards the centre. Compositors frequently make an error in not allowing for the lock-up. This has a tendency to squeeze and cramp the job in every way. A reasonable looseness should consequently be allowed in the composition. As the form is tightened, places where the matter yields can have a bit of lead or card added when it is again loosened. Unless Dutchmen (wooden plugs) are used it is very difficult to make a form in which there are curved lines lift without going over it somewhat again. Type is rectangular, and curves do not agree with it. It is a common practice in many offices to fill up the hollow spaces, after the proof has been corrected and the matter justified, with plaster-of-paris. This is poured in in a fluid shape, but very soon sets. Sometimes wet paper, made into a pulp, is crowded in. If the run is to be twenty or thirty thousand it is better to work from an electrotype than the original, as the letters are liable to be drawn out on the press.

Curvilinear Plates. — Special stereotype plates curved, cast and bent for cylinder machines, as used for newspapers.

Curvilinear Quadrats.—See QUADRATS.

J. STEARNS CUSHING.

Cushing, J. Stearns, a printer of Boston, was born at Bedford, Mass., on May 3, 1854. He received a good education, and upon his fourteenth birthday, in 1868, began the printing trade with Welch, Bigelow & Co. of Cambridge. He acquired a thorough knowledge of the art, which he improved in the principal Cambridge and Boston offices, beginning business in Boston for himself in the autumn of 1878. He adopted the specialty of fine bookwork, devoting himself particularly to the making of school and scientific text-books, and in this has been highly successful. He was active in organizing the Boston Master Printers' Club and was its first secretary. He has since its organization been a delegate to all the conventions of the United Typothetæ, and one year was its recording secretary. His office deserves notice as being the most extensive one in America in which women are largely employed in the composition of Greek, algebra, &c., and for proof-reading.

Custom of the House.—The rules and regulations which are in vogue in any particular printing-office.

Customs, Ancient.—The printing art being kept a secret at the beginning, and being afterwards practiced under the encouragement of the great, many peculiar customs were developed among the workmen, which are narrated by Moxon. In his day there were probably no more than three or four hundred workmen in England, and every one was obliged to serve a long apprenticeship, during which he became familiar with the ancient usages. Nearly all of these have died out in the United States, but a number are still retained in Great Britain. The boy is not bound in this country and does not become free, nor has the system of fines and refreshment so elaborately described by the author of the Mechanick Exercises ever had a lodgment here. The custom as to a seven-years apprenticeship was to some extent curtailed before the Revolution, five years becoming common. The workmen then wore long aprons reaching up to their throats, and paper caps. It is about forty years since this was finally abolished. On New Year's Day a carrier's address was delivered and is still in many places, a gratuity being given to the carrier at each house. On the first of April the boy was sent out to borrow some Italic spaces. The office he was directed to was the one most distant from the one from which he was sent. The foreman of the office, when he heard of the message, regretted that their spaces of this kind were all out, but thought the youngster could obtain them at such another place. So the apprentice was sent from one office to another until all had been visited, and he was obliged to return. It is a curious fact that most compositors to this day do not know that Italic or inclined spaces are made for scripts and for wood-letter. On election night there was a custom of serving lunch to the workmen who were setting up the returns, but this seems to have died out. There was also a usage in many offices of giving a little entertainment at the house of the employers when the principal work of the year was finished, as, for instance, a directory. The late Mr. Benham of New Haven was perhaps the last who kept this up. Salutation of a newly-married man by striking chases, scraping cases and drawing mallets over imposing-stones was formerly common. The following is the description given in 1683 by Moxon of the customs then current:

ANCIENT CUSTOMS USED IN A PRINTING-HOUSE.

Every Printing-house is by the Custom of Time out of mind, called a Chappel; and all the workmen that belong to it are Members of the Chappel: and the Oldest Freeman is Father of the Chappel. I suppose the stile was originally conferred upon it by the courtesie of some great Churchman, or men (doubtless when Chappels were in more veneration than of late years they have been here in England), who for the Books of Divinity that proceeded from a Printing-house, gave it the Reverend Title of Chappel.

There have been formerly Customs and By-Laws made and intended for the well and good Government of the Chappel, and for the more Civil and orderly deportment of all its Members while in the Chappel; and the Penalty for the breach of any of these Laws and Customs is in Printers' Language called a Solace.

And the Judge of these Solaces, and other Controversies relating to the Chappel or any of its Members, was plurality of Votes in the Chappel. It being asserted as a Maxim, That the Chappel cannot Err. But when any Controversie is thus decided, it always ends in the Good of the Chappel.

1. Swearing in the Chappel, a Solace.
2. Fighting in the Chappel, a Solace.
3. Abusive Language, or giving the Lye in the Chappel, a Solace.
4. To be Drunk in the Chappel, a Solace.
5. For any of the Workmen to leave his candle burning at Night, a Solace.
6. If the Compositor let fall his Composing-stick, and another take it up, a Solace.
7. Three Letters and a Space to lye under the Compositor's case, a Solace.
8. If a Press-man let fall his Ball or Balls, and another take it up, a Solace.
9. If a Press-man leave his Blankets in the Tympan at Noon or Night, a Solace.

These Solaces were to be bought off, for the good of the Chappel: Nor were the price of these Solaces alike: For some were 12d. 6d. 4d. 2d. 1d. &c., according to the nature and quality of the Solace.

But if the Delinquent prov'd Obstinate or Refractory, and would not pay his Solace at the Price of the Chappel, they Solac'd him.

The manner of Solacing, thus.

The workmen take him by force, and lay him on his Belly athwart the correcting-stone, and held him there while another of the work-men with a Paper-board, gave him 10l. and a Purse, viz. Eleven blows on his Buttocks; which he laid on according to his own mercy. For Tradition tells us, that about 50 years ago one was Solaced with so much violence, that he presently voided Blood; and shortly after dyed of it.

These nine Solaces were all the Solaces usually and generally accepted: yet in some particular Chappels the work-men did by consent make other Solaces, viz.

That it should be a Solace for any of the Workmen to mention joyning their Penny or more apiece to send for Drink.

To mention spending Chappel-money till Saturday night, or any other before agreed time.

To play at Quadrats, or excite any of the Chappel to play at Quadrats, either for Money or Drink.

This Solace is generally purchas'd by the Master-Printer; as well because it hinders the Workmen's work, as because it Batters and spoils the Quadrats: For the manner how they Play with them is thus: They take five or seven more m Quadrats (generally of the English Body) and holding their Hand below the Surface of the Correcting-Stone, shake them in their Hand, and toss them upon the Stone, and then count how many Nicks upwards each man throws in three times, or any other number of times agreed on: And he that throws most Wins the Bett of all the rest, and stands out free, till the rest have try'd who throws fewest Nicks upwards in so many throws; for all the rest are free: and he pays the Bett.

For any to Take up a Sheet, if he receiv'd Copy-money; Or if he receiv'd no Copy-money, and did Take up a Sheet, and carryed that Sheet or Sheets off the Printing-House till the whole Book was Printed off and Publisht.

Any of the Workmen may purchase a Solace for any trivial matter, if the rest of the Chappel consent to it. As if any of the Workmen Sing in the Chappel; he that is offended at it may, with the Chappels Consent purchase a penny or twopenny Solace for any of the Workmens singing after the Solace is made; Or if a Workman or a Stranger salute a Woman in the Chappel, after the making of the Solace, it is a Solace of such a Value as is agreed on.

The price of all Solaces to be purchased is wholly Arbitrary in the Chappel. And a Penny Solace may perhaps cost the Purchaser Six Pence, Twelve Pence, or more for the Good of the Chappel.

Yet sometimes Solaces may cost double the purchase or more. As if some Compositor have (to affront a Press-man) put a Wisp of Hay in the Press-man's Ball-Racks; If the Press-man cannot well brook this affront, he will lay six Pence down on the Correcting Stone to purchase a Solace of twelve pence upon him that did it; and the Chappel cannot in Justice refuse to grant it: because it tends to the Good of the Chappel: And being granted, it becomes every Member's duty to make what discovery he can: because it tends to the farther Good of the Chappel: And by this means it seldom happens but the Agressor is found out.

Nor did Solaces reach only the Members of the Chappel, but also Strangers that came into the Chappel, and offered affronts or indignities to the Chappel, or any of its Members; the Chappel would determine it a Solace. Example,

It was a Solace for any to come to the King's Printing-house and ask for a Ballad.

For any to come and enquire of a Compositor, whether he had News of such a Galley at Sea.

For any to bring a Wisp of Hay, directed to any of the Press-men.

And such Strangers were commonly sent by some who knew the Customs of the Chappel, and had a mind to put a Trick upon the Stranger.

Other Customs were used in the Chappel, which were not Solaces, viz. Every new Workman to pay half a Crown; which is called his Benvenue: This Benvenue being so constant a Custome is still lookt upon by all Workmen as the undoubted Right of the Chappel, and therefore never disputed; yet he who has not paid his Benvenue is no Member of the Chappel nor enjoys any benefit of Chappel-Money.

If a Journey-man Wrought formerly upon the same Printing-House and any of the Chappel can prove it, he pays half a Benvenue.

I told you before that abusive Language or giving the Lye was a Solace: But if in discourse, when any of the Workmen affirm anything that is not believed, the Compositor knocks with the back-corner of his Composing-stick against the lower Ledge of his Lower Case, and the Press-man knocks the handles of his Ball-stocks together: Thereby signifying the discredit they give to his Story.

It is now customary that Journey-men are paid for all Church Holy days that fall not on a Sunday, whether they work or no: And they are by Contract with the Master Printer paid proportionably for what they undertake to Earn every Working day, be it half a Crown, two Shillings, three Shillings, four Shillings, &c.

It is also customary for all the Journey-men to make every Year new Paper Windows, whether the old will serve again or no; Because that day they make them, the Master Printer gives them a Way-goose; that is, he makes them a good Feast, and not only entertains them at his own House, but besides, gives them Money to spend at the Ale-house or Tavern at night; and to this Feast they invite the Correcter, Founder, Smith, Joyner, and Inck-maker, who all of them severally (except the Correcter in his own Civility) open their Purse-strings and add their Benevolence (which Workmen account their duty, because they generally chuse these Workmen) to the Master Printers: But from the Correcter they expect nothing, because the Master Printer chusing him, the Workmen can do him no kindness.

These Way-gooses are always kept about Bartholemew-tide. And till the Master-Printer have given this Way-goose, the journey-men do not use to work by Candle Light.

If a Journey-man marry, he pays half a Crown to the Chappel.

When his wife comes to the Chappel, she pays six Pence: and then all the Journey-men joyn their two Pence apiece to welcome her.

If a Journeyman have a Son born, he pays one Shilling.

If a daughter born, six Pence.

The Father of the Chappel drinks first of Chappel Drink, except some other Journeyman have a Token; viz. Some agreed piece of Coin or Mettle markt by consent of the Chappel: for then producing that Token, he Drinks first. This Token is always given to him who in the Round should have drank, had the last Chappel-drink held out. Therefore when Chappel drink comes in, they generally say, Who has the Token?

Though these Customs are no Solaces, yet the Chappel Excommunicates the Delinquent; and he shall have no benefit of Chappel-money till he have paid.

It is also customary in some Printing-houses that if the Compositor or Press-man make either the other stand still through the neglect of their contracted Task, that then he who neglected, shall pay him that stands still as much as if he had wrought.

The Compositors are Jocosely called Galley Slaves; Because allusively they are as it were bound to their Gallies.

And the Press-men are Jocosely called Horses: Because of the hard Labour they go through all day long.

An Apprentice when he is Bound pays half a Crown to the Chappel, and when he is made Free, another half Crown to the Chappel; but is yet no Member of the Chappel; And if he continue to Work Journey-work in the same House, he pays another half Crown, and is then a Member of the Chappel.

The Printers of London, Masters and Journey-men, have every Year a general Feast, which since the rebuilding of Stationers Hall is commonly kept there. This Feast is made by four Stewards, viz, two Masters and two Journey-men; which Stewards, with the Collection of half a Crown apiece of every Guest, defray the Charges of the whole Feast; and as they Collect the Half-Crowns, they deliver every Guest a Ticket, wherein is specified the Time and Place they are to meet at, and the Church they are to go to: To which Ticket is affixed the Names and Seals of each Steward.

It is commonly kept on or about May-day: When, about ten a Clock in the Morning they meet at Stationers Hall, and from thence go to some Church thereabouts; Four Whifflers (as Servitures) by two and two walking before with White Staves in their Hands, and Red and Blue Ribbons hung Belt-wise upon their left Shoulders. Those go before to make way for the Company. Then walks the Beadle of the Company of Stationers, with the Company's Staff in his Hand, and Ribbons as the Whifflers, and after him the Divine (whom the Stewards before ingag'd to Preach them a Sermon) and his Reader. Then the Stewards walk by two and two, with long White Wands in their Hands, and all the rest of the Company follows, till they enter the Church.

Then Divine Service begins, Anthems are Sung, and a Sermon Preached to suit the Solemnity: Which ended, they in the same order walk back again to Stationers Hall; where they are immediately entertain'd with the City Weights and other Musick: And as every Guest enters, he delivers his Ticket (which gives him Admittance) to a Person appointed by the Steward to receive it.

The Master, Wardens and other Grandees of the Company (although perhaps no Printers) are yet commonly invited, and take their Seats at the upper Table, and the rest of the Company where it pleases them best. The Tables being furnish'd with variety of Dishes of the Best Cheer: And to make the entertainment more splendid is usher'd in with Loud Musick. And after Grace is said (commonly by the Minister that Preach'd the Sermon) every one Feasts himself with what he likes Best; Whiles the Whifflers and other Officers wait with Napkins, Plates, Beer, Ale, and Wine, of all sorts, to accommodate each Guest according to his desire. And to make their Cheer go cheerfuller down, are entertained with Musick and Songs all Dinner time.

Dinner being near ended, the Kings and the Dukes Healths is begun, by the several Stewards at the several Tables, and goes orderly around to all the Guests.

And whiles these Healths are Drinking, each Steward sets a Plate on each Table, beginning at the upper end, and conveying it downwards, to Collect the Benevolence of Charitable minds towards the relief of Printers Poor Widows. And at the same time each Steward distributes a Catalogue of such Printers as have held Stewards ever since the Feast was first kept, viz, from the Year of Christ 1621.

After Dinner, and Grace said, the Ceremony of Electing new Stewards for the next Year begins; Therefore the present Stewards withdraw into another Room: And put Garlands of Green Laurel, or of Box on their Heads, and White-wands in their Hands, and are again Usher'd out of the withdrawing Room by the Beadle of the Company, with the Company's Staff in his Hand and with Musick sounding before them: Then follows one of the Whifflers with a great Bowl of White-wine and Sugar in his Right Hand, and his Whifflers Staff in his Left: Then follows the Eldest Steward, and then another Whiffler, as the first, with a Bowl of White-wine and Sugar before the second Steward, and in like manner another Whiffler before the Third, and another before the Fourth. And thus they walk with Musick sounding before them three times around the Hall: And in a fourth round the first Steward takes the Bowl of his Whiffler and Drinks to one (whom before he resolved on) by the Title of Mr. Steward Elect: And taking the Garland off his own Head puts it upon the Steward Elects Head. At which Ceremony the Spectators clap their Hands, and such as stand on the Tables or Benches, so Drum with their Feet that the whole Hall is filled with Noise, as applauding the Choice. Then the present Steward takes out the Steward Elect, giving him the Right Hand, and walks with him Hand in Hand, behind the three present Stewards another Round about the Hall: And in the next Round, as aforesaid, the Second Steward Drinks, to another with the same Ceremony as the first did; and so the Third Steward, and so the Fourth, and then all walk one Round more Hand in Hand about the Hall, that the Company may take notice of the Stewards Elect. And so ends the Ceremony of the Day.

This Ceremony being over, such as will go their ways; but others that stay, are Diverted with Musick, Songs, Dancing, Farcing, &c till at last they all find it time to depart.

Cut.—An engraved block or plate in relief; a woodcut. The term is supposed to have originated from the fact that engraving is executed by cutting. No other term is commonly used in the printing-office. It is not employed for a steel or copper-plate engraving. Electrotype or stereotype cuts should be proved on coming into an office and one proof given to the author, the other being pasted into a book, with a number against it, referring to the location in which it is to be placed, so that it may easily be found again. It should then be laid on a shelf, together with those whose numbers are closest to it. The pile should not be very high, as it must be unpiled to take out those at the bottom when they are needed. Each pile should have a tag to show the largest and smallest number contained in it, as B 1 to 23, and between each layer should be a sheet of card-board or mill-board. It is most convenient to name the cuts after their owners, as Jones 1827, Alexander 97, Times 112. The books in which these impressions are pasted should be large ones, a foot or more in length, so that as many as possible can be put on a page. When a cut is sent away a receipt should be taken for it and a memorandum made on the page: "Delivered June 7, 1891." Cuts accumulate very rapidly, and customers should consequently be requested to take them away as soon as possible after being used. When they neglect to do so a note should be sent to them, with a printed heading, saying: "Engravings or stereotype blocks left in the care of Caxton & Co. after printing are at the owner's risk, as Caxton & Co. will not be responsible." In many cases, of course, an agreement may be made by which they are to be retained, but the printer should disclaim responsibility for loss, whether for fire or other reason. When an agreement has been made to store them after use the stereotype or electrotype blocks, indexed as before, should be packed away in boxes and placed in vaults, each box having a mark upon it to show its contents. It is not advisable to put wood-cuts in a vault, as they are likely to swell from moisture. Neither should they be piled up on shelves, but laid on their edges. See under WOOD-CUTS. Much discussion has taken place among printers as to what should be done with cuts and stereotypes left in their possession, when they cannot be delivered, but no definite conclusion has been reached.

Cut-Against.—A board against which the knife of a cutting-machine strikes.

Cut Down.—When a plow-knife dips downward out of the level it is said to cut down, but if it reverses this movement it is said to cut up.

Cut Edges.—A book which has been cut by a machine is said to have cut edges. If only opened by a knife at each place where the fold occurs it is said to be uncut. Uncut, therefore, has the same meaning as untrimmed, and cut signifies trimmed.

Cut Flush.—In bookbinding this means that the cloth cover is drawn on the book and the whole cut at once, cover and all, the edge of the cover being cut flush with the edge of the book.

Cut Forms.—Forms containing illustrations, in contradistinction to ordinary forms in which there are no illustrations.

Cut-in Letter.—A type of large size adjusted at the beginning of a chapter.—*MacKellar.*

Cut-in Note.—A note justified into the side of a page. The type is always much smaller and the words are few. The note forms a rectangle, and is taken out of the square of the page, as in the margin. The compositor receives an extra price for this work, as it is very troublesome. It should be against the matter to which it refers, and should have more than one line follow it in the same paragraph.

Cut-in
Note.

Cutter.—The person in the warehouse who does the cutting of paper.

Cutting-Machine.—See PAPER-CUTTER.

Cutting Matrixes.—To cut the punches necessary to form the matrixes. An inaccurate expression.

Cutting-out Knife.—A sharp-pointed knife used in making ready.

Cutting the Frisket.—To cut out of the frisket spaces sufficient to allow the types to strike against the sheet to be printed.

Cyclostyle.—An apparatus for obtaining manifold fac-simile copies of writing, &c. Punctures are made in the matrix by points on a little wheel, and through these points color is forced in a manner similar to a stencil, but with a roller instead of a brush.

Cylinder Bearers.—Pieces of wood at the side of the bed of a press, type high or thereabouts, so that the hardness of the impression may not be so sensibly felt at the edges.

Cylinder Galley-Press.—The English name for a proof-press which gives its impression by rolling over the type a heavy roller of metal.

Cylinder Press.—A printing-machine giving its impression by means of a cylinder. It is known as small cylinder or large cylinder, according to its dimensions. A double cylinder is where two cylinders are employed to give an impression against a flat bed; but a four, six, eight or ten cylinder press is where one large cylinder, upon which is a form, rotates in succession against a number of smaller ones, each of these smaller ones giving an impression at each rotation. See PRESS.

Cylinder Sheets.—The sheets pasted upon the cylinder which form the foundation of the making-ready.

Cylindrical Printing.—A term frequently used in the older books to imply printing upon a cylinder press.

D

D THE fourth letter of the alphabet. It is a thick letter, being in width a little more than half its height from top to bottom. In lower case it is nearly like an overturned p, but with a difference in the serif. The capital D, it is said, was copied from the Greek Δ or Delta. As an initial letter on medals, &c., it indicates the names of countries, cities and persons; also the words devotus, designatus, divus, dominus, &c.; D. M., diis manibus; D. O. M., Deo Optimo Maximo. Among Roman numerals D signifies 500, but it did not do so, according to a German authority, until fifteen hundred years after Christ. The Romans designated 1,000 in this way: CIↃ. The early printers, continues the same authority, thought it best to express 500 by half the character of 1,000, and therefore introduced IↃ, which soon grew into D. If a line was marked over it it signified 5,000. In dedications D. thrice repeated signifies Dat, Donat, Dicat; or Dat, Dicat, Dedicat. As an abbreviation of the jurists, D signifies the Pandects (Digesta). D stands for doctor in M. D., LL. D., and a number of other abbreviations. It is the second note of the scale, beginning with C. In lower case, d. stands for penny (denarius). C. O. D., collect on delivery; A. D., year of our Lord.

Dabber.—A soft leather or silk ball, used instead of a roller for inking a printing-form, more frequently by engravers than printers. In former years, before the introduction of rollers, this was never known under any other title than ball.

Dabbing.—In bookbinding, to dab a wet sponge filled with some color upon the cover of a book, either covering it completely or only in part, then following it with another sponge having a different color.

Dagger.—A reference mark, thus: †, used in printing and writing; also called obelisk. It is the second reference mark, coming next after the star. In German books and newspapers, following a person's name, it signifies that he is dead.

Dallastypie.—A method of process engraving.

Daily Newspapers.—These have been in existence in the United States since 1785, the Daily Advertiser having been begun in Philadelphia in that year, and a journal of the same name in New York two years subsequently. It was not long before this example was imitated in the other cities of the United States, and the number of dailies has now increased so rapidly that there are said to be 1,536 in the Union at present and ninety in the British provinces. A daily newspaper has a threefold character. It is a daily historian, collecting the news of the whole world as well as it conveniently can, but that of its immediate neighborhood very fully; an agency by which private persons can make known to the whole community more effectually than in any other way what they desire to buy and what they have to sell; and it is also a printing-office, where the news and advertisements may be set up, printed and distributed. In the smallest dailies a single person may sometimes supervise all these functions, but the success of the enterprise then depends completely upon the health and industry of that individual. The classes into which daily newspapers are generally divided are four. There is the small daily, such as may be found in towns of twenty thousand people, having a circulation of fifteen hundred or two thousand copies, and total receipts annually varying from $10,000 to $30,000; the daily in places like Syracuse, Troy or Des Moines, where circulations may reach ten thousand and total receipts of the largest approximate $100,000 or $150,000; the daily in large places like Minneapolis, San Francisco or Baltimore, perhaps reaching twenty or twenty-five thousand circulation and having receipts from $200,000 to $400,000; and the large and expensive newspapers carried on only in Boston, New York, Philadelphia, Cincinnati, St. Louis and Chicago, having receipts varying from half a million to two millions annually and circulations varying from forty to a hundred and fifty thousand. Those last named can spend money on projects which would bankrupt smaller publications, and yet have them productive. In the journal of the second class given there will be an editor and assistant, who together manage the paper and write the editorials; a telegraph editor, a city editor and a number of reporters, from four to ten, according to the size of the place and of the newspaper; a man who looks after the markets, and two or three paid correspondents. In the counting-room there will be the publisher, a bookkeeper and several clerks, and outside there will be a collector of advertisements. At night there will be the mailing and delivery clerks, and the carriers will appear at daybreak. In the printing-office a foreman and from fifteen to twenty-five men are required, and in the pressroom two or three pressmen and as many boys. With each enlargement the force increases, possibly reaching in all departments five or six hundred persons in the largest establishments. Here each subdivision is very much specialized. Instead of a single man being employed to do a certain thing, there is an army.

The effort of most newspapers of to-day is to make the largest attainable profit. Their conductors care little about influencing public opinion if their balance-sheet looks right at the end of the year. To attain this it is necessary to have their paper interesting, that it may sell well. The plain matter of fact account of murders, quarrels, crimes and public affairs which suited the last generation, and still suits the English, is too dull. It must be copious, as each reader does not peruse the whole journal, but only the portion which interests him. It must omit nothing that is in a rival's newspaper, for that leads to the impression that the management is careless in the collection of news. Having taken care of these things, provided specialists for the topics that ordinary men know very little about, and commented suitably upon what has happened, the editor's duty is done. The publisher has several things to see to of almost equal importance. He is, of course, charged with the responsibility of furnishing the money to keep the business going, to pay the salaries and wages and to buy the supplies. All the employees, including those of the printing-office, are under his control and subject to removal by him, except those in the editorial department. He must see that the paper is delivered and that the proper efforts are made to extend its circulation. This extension, however, is determined chiefly by its readableness and by the interest it creates in its neighborhood, and if it maintains a high standard in these respects the desired result probably will come speedily. Half of the income is derived from advertisements, the effort of the publisher always being to have as great a number as possible. The reason why one newspaper has many advertisements and another has few is that the former has succeeded in impressing upon the community the idea that it pays to insert notices in it. It does not follow necessarily that the paper having the largest circulation is the best one in which to advertise. The printing of a paper, its typographical display, and the fact that it circulates among a class which is able to buy are all factors in determining the value of advertising. Most newspapers receive a great deal from advertising agents, and they themselves generally employ a man or two to gather advertisements. Branch offices for their receipt are kept by the larger New York dailies in uptown localities.

The accounts of a daily newspaper are not complicated. In small towns the advertising is mostly by the year, and special terms and special credits are held out. Strangers must pay cash in advance. In large cities only well-known houses which are in the habit of advertising have credit given them. Thus a bank or trust company will ordinarily pay cash, while a mercantile house with a quarter of the capital which does considerable advertising will have credit if desired. One or two hundred accounts are as many as are kept by any New York daily, and in these are included perhaps twenty of advertising agents. These agents are glad to receive advertisements from any responsible source, give credit to the advertiser and pay cash, if necessary, to the newspaper. New York dailies present their accounts every month and expect payment at once. The news companies pay once a week for what they get, and the carriers at the same time. Very few newspapers of the largest class now have carriers. Those who deliver the journals are small newsdealers who the day before purchase tokens or slips of paper entitling them to as many newspapers as they are likely to require, and give these checks or tokens to the delivery clerk in the morning. Thus no time is lost in making change, and the newspaper knows more closely the total number which it will be necessary to print. But in New York the wholesale news companies perform this function to a very great extent. They deliver to the newsdealer, which the morning newspapers will not do, and they also sell him everything else he desires. On a two-cent paper the usual discount to the deliverer is half a cent, and on the three-cent papers three-quarters of a cent; but this is sometimes exceeded. Half a cent is generally demanded on one-cent papers, although this is a large price for distribution.

The largest bill on a very largely circulated daily is for paper. All such newspapers are now printed on web presses, and the quantity of paper used is enormous. The next expense in some places is the editorial, while in others it is the composing-room. The stereotyping expenses are dealt with as a part of those of the composing-room. The paper is purchased by the counting-room, and its receipt is verified by one of the men in the pressroom who is charged with that duty. The compositors paste their slips or duplicates together, and these are measured on Thursday by one of the assistant foremen, who also adds to the account all the bills of weekly hands and sends it to the cashier. If the place is not a very large one this may be done on Friday. On Saturday, the figures having been verified as to addition, the amount is sent up in separate envelopes and the men are then paid. In the editorial room one of the men is charged with the special duty of keeping the accounts of that department, and he makes up the roll at the end of the week. The city editor has examined the bills of the reporters and verified them against the proofs; has measured the amounts and entered the names on his book. The additional editorial expenses are placed with these by the editor's secretary, the managing editor or whoever has this responsibility, and the book or sheet is then sent to the counting-room. But no money is sent back with it. Each man has a check given him similar to one drawn on a bank, which he presents in the publishing-office. The pressroom has a similar book to the composing-room, and so has the counting-room. All bills are included in these four departments. First, the composing-room, including the proof-room and stereotypers; second, the editorial room, including salaries, telegraph expenses and special sums paid out for news or traveling expenses, &c.; third, the pressroom; and, fourth, the publication office. Under this are included paper, ink, presses, type, repairs to building, rent, gas and so on; but some publishers afterwards divide this under other headings, so that expenses can be more carefully analyzed. No department receives any money and none actually pays out any, except the counting-room. Should a reporter be sent at midnight from Boston to St. Paul, an order would be given on the counting-room for the cash necessary for fare. If it was not in hand enough must be borrowed from some one in the building, or else the journey must be postponed. The editorial department has no money of its own.

Subscriptions are kept by the same plan on the weekly edition that is practiced on country newspapers. Each issue has a certain whole number, as 533. When a subscription begins, instead of putting it down as the 10th of August, 1891, to expire August 9, 1892, fifty-one numbers are added, and it expires with No. 584. In this way the year only has 364 days. With the daily the date system is followed.

The changes in newspaper printing within a few years have been very great. Up to about 1852 most of the New York dailies were printed upon a flat-bed press, and nearly all of those in other cities. Hoe's type-revolving press, with four cylinders, was introduced in 1847. Five years later the largest circulations were of sixty thousand, but on one four or six cylinder press the first or second side required in the one case twelve hours and in the other eight hours. Thus the New York Sun, which had this circulation, went to press with its second side at midnight, and did not complete the impression till 8 o'clock in the morning. Theoretically, each cylinder printed three thousand an hour; practically, a four-cylinder could not be depended upon, day after day, for more than five thousand an hour. The next advance was in having two or three presses, so that the first side could be held back nearly as late as the second side. Then the number of cylinders was increased until it reached ten, which would theoretically print thirty thousand in an hour, and could be depended upon for twelve or thirteen. These presses were multiplied till some establishments had eight of different sizes. The largest were as tall as an ordinary three-story house. In 1860 Charles Craske, of New York, succeeded in getting publishers to look at his device for paper stereotyping, which had then been shown for six years. By this process two, three or four plates could be made of the same pages, and as many presses put at work at once. At about the same time Bullock invented his press, which utilized this stereotyping method and the web system of feeding, and after the war, the machine having been more thoroughly worked out on the London Times in the Walter press, it formed the basis of the Hoe web press, which was, however, far more perfect. Since that time a number of other press-builders have adopted the same theory. The pressroom has become much more compact and its cost is far less than it was when only half as many copies were printed. The number of compositors has much increased, as well as the use of the telegraph. Special wires are now very common, and ten or twenty columns are frequently thus received on the Chicago and Philadelphia dailies. In 1858 the newspaper in New York that employed the most compositors had forty-five. Very few of the present dailies have so small a force;

four or five pass ninety, and one employs one hundred and fifty. In 1828 the total receipts of the largest New York daily were $30,000; in 1852 they were $400,000, and they must now exceed $2,250,000.

Dalton, Michael, an eminent Boston founder, died on October 24, 1879, lacking a few months of being eighty years old. He served his apprenticeship in the Boston Type-Foundry, in 1845 entering into copartnership with Sewall Phelps and purchasing the Dickinson Type-Foundry, which they afterwards carried on as Phelps, Dalton & Co. He was a very skillful workman.

Dandy or **Dandy Roll.**—A roller affixed to the paper-making machine. It consists of a light metal frame or cylinder covered with fine wire-cloth; the wet web of paper carried on the endless wire of the paper-machine passes under this roller and is pressed by it. It also serves to give the laid or wove appearance to the sheet of paper, and when various figures, letters or other devices are worked in fine wire on its exterior it produces the effect known as water-marking, the paper being made thinner at the points of impression. See under PAPER.

Danish.—The Danish language has twenty-seven letters, including q, which is discarded by some grammarians as useless. Both the black-letter or German and the Roman characters are used, the latter almost exclusively in scientific works. The Å or å is represented in the black-letter the same way, a little circle going over the top; it represents a broad or double aa. The Ø or ø is likewise imitated in the black-letter; the Æ and œ, formed as in English, are represented in Gothic characters made in the same style, and the Ö and ö have dots over the top in both sets of characters. Every noun is printed with a capital letter, as in German. In the black-letter the German double letters are used. There is a large body of literature in Danish, and a great amount of printing is executed in that language.

Dash.—A mark of punctuation which indicates, when strictly used, a complete change in the sentence before and after, but generally used somewhat like a parenthesis or a colon. It is very difficult to lay down rules for its use. Many writers use it as strengthening the sense of the previous pause, and therefore combine it with the comma, the semi-colon or the colon; but this usage is not that of the best printers. It is totally inadmissible as something to fill out a line, when that ends with a period and there is hardly enough matter. Some offices put a thin space on either side, but general authority is against this practice. Used under words in catalogues it signifies ditto, but in tables expresses a blank. It has also this sense in ordinary reading matter. Dashes are cast on en, em, two-em and three-em bodies, and were formerly cast on larger ones, but this practice has gone out of use. The line is exactly in the centre of the body in each of them, and they can be joined together to make a long dash. Hyphens cannot be added to make up a little deficiency, as their body is generally a little heavier and the face is cast a trifle lower. Dashes are used for the separations between the heads of tables and the columns, brass rules being perpendicular, and they are also used to divide the footings from the main part.

Davidson, James, the editor of the National Publisher and Printer, is a native of Scotland, and was born at Lempitlaw on the Tweed on March 1, 1835. He came to America in 1857, and has lived in Louisville, Ky., since that time. His first work was in the office of the Presbyterian Herald as bookkeeper and assistant editor, and he continued in that position until the breaking out of the war. In 1864 he began the publication of the Western Presbyterian, and a few years later added books and a printing department, in which he has continued ever since. During part of the time he was associated with his brother, Andrew Davidson. In 1886 he began the publication of the Southern Publisher and Printer, especially in the interest of employing printers, among whom he advocated the formation of a national organization. After the formation of the United Typothetæ at Chicago in 1887, at which he was present as a delegate, and was chosen recording secretary, the name of his journal was changed to the National Publisher and Printer. He has since performed much labor for the society, and has aided it materially in its extension.

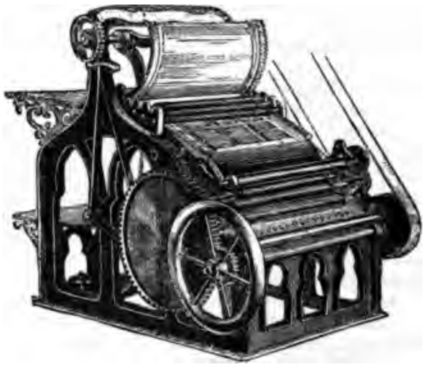
JAMES DAVIDSON.

Davidson, Thos., an early Scotch printer, who had an office in the Fryere's Wynde in Edinburgh in 1536.

Davis Oscillating Press.—A press made in Rhode Island between 1850 and 1860, in which part of a cylinder, triangular in form, but with a curved face, rocked backward and forward over the form. The press did good work. No strings or tapes were used with the sheets, and good register was afforded.

Davy, William.—This gentleman, who was a clergyman, wrote a System of Divinity in a Course of Sermons, filling twenty-six volumes, of which he was not only the author but also the compositor, pressman and binder. He had no assistance, except such as he derived from a servant-girl, who inked the types for a portion of the edition. Only fourteen copies were printed. The work was issued between 1796 and 1807. The typography is poor, of course, but it is probably the largest work ever executed by an amateur.

Day, John, the most eminent of the British printers in the sixteenth century, was born at Dunwich, England. He began business about 1546 in St. Sepulchre's parish, London, at the sign of the Resurrection, and was for a time partner with William Seres. In 1549 he removed to the old city gate called Aldersgate. In September, 1552, he had a license for printing the Catechism, with the brief of an A B C or primer. When Queen Mary ascended the throne he was seized and thrown into prison as an ultra-Protestant, in company with John Rogers, the martyr, but afterwards succeeded in escaping over the sea. He returned in 1556, being the first person admitted into the livery of the Stationers' Company after it had received its charter from Philip and


DAVIS OSCILLATING PRESS.

Mary. Elizabeth's accession changed the religious complexion of the authorities, and Day was afterwards one of the principal publishers. He was warden of the Stationers' Company in the years 1564, 1566, 1571 and 1575, and master in 1580. In 1572 he erected a new office in St. Paul's Churchyard. It was a neat, handsome shop, writes a contemporary chronicler. "It was but little and low, and flat-roofed and leaded like a terrace, railed and posted, fit for men to stand upon in any triumph or show; but could not in any wise hurt and deface the same. This cost him forty or fifty pounds." The other stationers did not like it that he was granted such a privilege, but were unable to prevent it, as he had powerful friends at court. At about this time he was engaged by Archbishop Parker to print an answer to a foreign work which had cast unfavorable reflections upon the prelate. Black-letter had been the common type used up to this time in England, and Roman and Italic were generally employed only for emphasis, for quotations or for subsidiary matter. Parker determined that he would have his books in the form common to the South of Europe, and thus wrote to a correspondent: "To the better accomplishment of this worke and others that shall followe, I have spoken to Daie the printer to cast a new Italian letter, which he is doinge, and it will cost him xl marks; and loth he and other printers be to print any lattin booke, because they will not heare be uttered, and for that Bookes printed in Englande be in suspition abroade." He was the first who cut and cast Saxon characters. Greek was also brought by him to a state of very great perfection. He published, among a vast number of other things, a collection of notes of English history, written at the time of Alfred, which forms the foundation of the study of the chronicles of England before the Norman invasion. He printed John Fox's Book of Martyrs. Two hundred and forty-five works are known to have been brought out from his press. His mark was a punning one, as was common at that day. The sun is shown rising, and a boy is represented as awakening his sleeping companion, saying: "Arise, for it is Day." He was twice married and had by each wife thirteen children. He died on July 23, 1584, at Walden, in Essex, having followed the occupation of a printer for more than forty years. He was buried in the church of Bradley-Parva, where, against the north wall of the chancel, is a tablet to his memory which is inlaid in brass with the effigies of a man and woman kneeling against a table, before which are two children in swaddling clothes, while behind the man are six sons and behind the woman five daughters, all kneeling in his honor.

Daye, Stephen, who was the first printer in the present United States, was employed by the Rev. Joss Glover to come over here and take the management of the press at Cambridge, Mass. He was supposed to be a descendant of John Day, the eminent English printer, but no positive proof exists of this. He was born in London and served his apprenticeship there. The press was put into operation in the early part of 1639, and Daye continued in its charge about ten years. Thomas thinks he was bred to the press, as his knowledge of composition was slight. It is not known why he ceased; Mr. Dunster, the president of the college, who was his employer, may have been dissatisfied with him, and he may have concluded that he earned too little. He afterwards sued Dunster for one hundred pounds for former services, but was non-suited. In some legal papers after 1650 Daye is styled locksmith. He was granted three hundred acres of land in 1641, but had not yet received them in 1655, as the order was then confirmed. He died in Cambridge on December 22, 1668, aged fifty-eight. No imprint is to be seen on any of his books.

Dayton, Ohio.—A city sixty miles north of Cincinnati, founded in 1795. Newspapers have been issued there since about the beginning of the century, the Journal having been founded in 1808. There are five dailies, eight weeklies and nine other periodicals. There are several large job offices.

Dead.—Dead copy is that which refers to something the interest in which has gone by, and which cannot, therefore, be employed; dead matter is type composed at a certain time which has lost its value and is to be distributed. Thus a statement of the ceremonies which were to take place at General Grant's funeral would be known as dead copy as soon as the obsequies took place, for it could never be used, the actual ceremonies differing largely from those which were given out to the press beforehand; and the type used in a report in a daily the day after the funeral was dead as soon as printed, unless part was to be used in a semi-weekly or weekly. The editors of a daily give out the copy which is desirable in the next issue, but the paper is always overset. There is more matter to go in than there is space. That which can be used next day is put aside, but much must be used that day or not at all. If it cannot be cut down and there is no room for it, it is killed, the corresponding word to this being saved. When killed it is known as dead; that which is saved is live. On a large daily the matter which is killed in a week sometimes has cost three or four hundred dollars for composition. In most dailies of large size copy which has once been set is to be paid for to the writer, whether used or not.

Deadhead.—This is a person who receives anything of commercial value without paying for it. It is most commonly used in reference to those who are given free entrance to places of amusement, gratuitous use of telegraph and express facilities, and passage in public conveyances without charge. It is often used in respect to members of the press. An abbreviation for this word is D. H., and an equivalent is in the phrase, "He has had his hat chalked."

Dead Horse.—Matter charged for before set. It is now difficult to do this; but formerly when compositors made up their own matter it was the custom to charge by pages. To make sure that the weekly bill would include all that might be done till Saturday night this portion was estimated. It can easily be seen how abuses could grow out of this. In Moxon's time this was known as horseflesh, the compositor abating it in his next bill. Savage entitles it horse.

Debito (Ital.).—To write in a bill a greater amount than has really been made. This leaves the compositor in debt the next fortnight.

Débloquer (Fr.).—To rectify letters which have been turned upside down while waiting for sorts.

Décharge, le Papier de (Fr.).—The set-off sheet.

Décharger (Fr.).—To discharge; décharger un apprenti, to discharge an apprentice.

Decimo-Octavo.—The fold of a book commonly known as 18mo. Printers do not use the Latin names for sizes higher than duodecimo. This is one of the most perplexing sheets to impose.

Decimo-Sexto.—The bibliographical term used for 16mo. It does not refer to the absolute fold of the sheet; neither do the terms octavo, quarto, 24mo nor 36mo. The ordinary 16mo is a little smaller than a duodecimo and a little squarer, as that is a little squarer than an octavo.

Deckel (Ger.).—The outer tympan.

Deckelbänder (Ger.).—The joints of the tympan.

Deckel Ueberziehen (Ger.).—To cover the tympan.

Deckle-Edged.—The rough, untrimmed edge of hand-made paper is called deckle-edged. The pulp is taken up in a sieve and shaken, and the sides naturally are uneven. Deckle-edges are imitated by cutting and tearing machine-made paper.

Découper la Frisquette (Fr.).—To cut out the frisket.

Dédicace (Fr.).—The dedication.

Dedication.—A preface or note following the title-page of a book, containing a complimentary inscription from the author to a particular person; an address to a patron, prefixed to a book, testifying respect and recommending the work to his protection and favor. A dedication may be in plain type, covering a portion of a page, set a size or two larger than the body of the book and double leaded, but it is more commonly displayed. Its place is on the third page. In this only capitals, small capitals and black-letter are used, but of late years Italic capitals have also been employed in occasional lines. The lines are divided according to sense and to the connection of the words, and the name of the person the book is dedicated to always makes a line. Of the above examples the first is taken from Buckle's History of Civilization, but the other is an imaginary one.

TO
THE MEMORY
OF
MY MOTHER
I CONSECRATE
THIS VOLUME.

THIS VOLUME IS
RESPECTFULLY INSCRIBED
TO THE
PRINTERS OF THE UNITED STATES
BY A
PRINTER OF NEW YORK,
WHO FEELS DEVOTION TO ART
IS NECESSARY FOR
ALL FUTURE PROGRESS.

Dedikation (Ger.).—The dedication.

Défecteux (Fr.).—Spoiled; wasted.

Defekt (Ger.).—Spoiled; wasted; incomplete; battered letters.

Defektbogen (Ger.).—Sheets which complete an imperfect book; as a rule these are courteously furnished, if wanting, by German publishers.

Defektkasten (Ger.).—Sort case, font case.

Defektschrank (Ger.).—Closet for the sort or font cases.

Defektsettel (Ger.).—List of the additional sorts required after a font is laid.

Défets (Fr.).—Defects, injuries; also, sorts needed from the type-founder when a new font is first put into use.

De Foreest, Henry, an early New York printer. He published the New York Evening Post in 1746, and was a partner of Bradford in his last years.

Dégager (Fr.).—To unlock (a form or galley).

Degener Cylinder Press.—A machine patented in November, 1861, having a stationary bed, over which a cylinder was rolled, somewhat similar to a proof-press. It was, however, geared into a rack at the side, so that positive pressure could be applied, instead of depending upon weight. Instead of having a fly, the sheet was caught by nippers after being printed and laid upon the table, printed side up.

Degener, Frederick Otto, the inventor of the Liberty press, died in Brooklyn, N. Y., on March 15, 1873. He was an expert machinist, and had been for a number of years with George P. Gordon, the press-builder, for whom he was draughtsman and general designer. About 1859, while in Mr. Gordon's employment, he invented the successful jobbing-press generally called the Degener during his lifetime, but more commonly known as the Liberty at present. For many years this and the Gordon were the two job-presses principally in use. It was first manufactured under the firm-name of Degener & Weiler, but now by the Liberty Machine Company. Mr. Degener also invented and patented a machine for paging blank-books, an automatic fan, improvements in the cylinder press, improvements in ink distribution for job-presses, a large cylinder press and another job-press in addition to the Liberty.

De la Rue, Thomas, the printer of playing-cards, was born in England in 1794, learned the trade of a printer and subsequently embarked in business for himself. About 1820 he printed an edition of the New Testament in golden letters, and when Queen Victoria was inaugurated the Sun newspaper was by his aid printed in gold. He was active in the world's fairs at London in 1851 and in Paris in 1855. He died on June 7, 1866.

Delaware.—Printing was introduced into Delaware in 1762 at Wilmington. The principal publications are at Wilmington, which does a large job-printing business. The dailies published in this State number five, weeklies twenty and monthlies one.

Dele.—The mark of a proof-reader, signifying to take out. It is a d, made after the old style, the ascending stroke turning back, thus: δ. The proof-reader should exercise peculiar vigilance in these cases, when the revise returns, to see that more has not been taken out than should be, or that some error has not been made in correction. The word is the second person singular, imperative mood, of the active Latin verb deleo, to blot out, to expunge, and therefore signifies: Do thou expunge.

Deleted.—Taken out, as a word or a letter.

Délié (Fr.).—The hair-line, the serif.

Délier (Fr.).—To untie.

Deliverer.—A carrier of a newspaper or magazine; also, in some cases, the one who sees that the newspapers are furnished to the carriers and local agents.

Delivering Books.—It is the general practice with publishers to leave a work when finished in the warehouse of the printer, and to send written orders for the delivery of a part as occasion or convenience suits. The warehouseman should always be prepared to deliver copies to these orders at the moment, otherwise complaint will be made against him and he will incur blame; but he ought not on any account to deliver copies without a written order, for should there happen a mistake or an omission in the publishers making an entry, credit will not be given for them and he will be held responsible. He ought invariably to enter them instanter, and take the person's signature to the entry and file the order. He will then be enabled, when an account of the delivery is called for, to prove its correctness.—*Savage.*

Delivery-Board.—The place upon the press where the sheets are deposited after being printed.

Delphin.—A name applied to an edition of the Latin classics prepared by order of Louis XIV. for the use of the Dauphin, and therefore entitled in usum Delphini. These books were greatly esteemed for their accuracy.

Demi-Cadratins (Fr.).—En quadrats.

Demi-Feuille (Fr.).—A half sheet.

Demy.—A size of printing-paper which is 22½ by 17½ inches; writing-paper, 20 by 15⅛ inches.

Denmark.—A country in Europe, between the Baltic Sea and the German Ocean, small in size, but doing much printing. In 1878 the number of printing establishments in Copenhagen was fifty-two, there being 107 in the provinces; at the end of 1889 there were ninety-nine in the capital and 135 in the provinces, or an increase of 50 per cent.

Dentelle.—A lace-like dotting in binding, formed by the repeated impressions of a single tool.

Depreciation of Material.—All the material of a printing-office suffers from use, and an allowance must be made every year to replace that which is worn out. What that rate should be depends very largely upon the quantity of work done and the frequency with which it is handled. An office having forty thousand pounds of type and employing thirty compositors will not wear out its material as quickly as would be done if there were fifty or seventy-five men. As a rule, however, printing-offices are not stocked with much more type than is necessary to do the work, and the ratio of depreciation can be arrived at more closely than would be possible in the case just given. Direct injury on the press amounts to little. It is the locking-up, the planing, the correcting, and the setting and distribution which wear out letters. Before the introduction of stereotyping the New York Sun had a new dress every three months, the old one being destroyed in that time. The edition was about sixty thousand copies, and there was type enough in the office to set up the forms about five times. Therefore, seventy-eight impressions of 60,000 each used up twenty pages of type, thus giving the life of type at 936,000 impressions. On the Tribune, where more type was bought and the editions were not so large, a font lasted fifteen months. Since the introduction of stereotyping type lasts from two to four years. It must, however, in the end be replaced. So, too, must be the cases and frames, and in fact all the appurtenances of the composing-room; the presses must be repaired and finally discarded, as well as all of the other fixtures of the establishment. All attempts to fix an exact rate on this deterioration have proved failures; but it seems to be pretty well settled that in a book and job office the type must be replaced every six or seven years if much business is done; the galleys, cases, frames, stones and so on will not last longer than a dozen years, and the presses about twenty. In the case of presses a new reason for depreciation comes in not found in the type. The demand for better presses, to do work more easily, more rapidly or more skillfully, must be met in good offices, and consequently old presses, still capable of doing fair work, are thrown away to put in more perfect ones. Thus the Adams press was discarded in New York, as it did not turn out enough work for the space occupied. Supposing, therefore, that an office has fifty thousand dollars' worth of material, equally divided between the pressroom and the composing-room, its depreciation will be on

	Value.	No. of Years.	Depreciation.
Composing-room, type	$15,000	7	$2,143
Composing-room, miscellaneous .	10,000	12	833
Pressroom	25,000	20	1,250
Totals	$50,000	..	$4,226

or an average of about 8 per cent. a year. Any system of bookkeeping which does not include this expense does not disclose the true state of affairs. If such an office did a hundred thousand dollars' worth of work in a year 5 per cent. should be added to every bill for depreciation. De Vinne, in his Price-List, estimates the depreciation on machinery at 10 per cent.

Derome, Jacques Antoine, a skillful French binder of the last century, was one of a family of bookbinders which can be traced back to about the middle of the seventeenth century. They brought to perfection the figures like lace which had originated before them, but which they used freely. Jacques Antoine Derome died in 1761, and his youngest son, Nicolas Denis, also very skillful, died about 1790. Tooled morocco was the favorite style of Nicolas Derome.

Derriey, Charles, a Parisian type-founder, who attained great celebrity for his borders, vignettes and new devices. His specimen-book, published about 1860, gave a great impulse to fine printing in this country, where a number of copies were disposed of. The colors were fine, the register exact, and many new devices were shown. He was born at Moissey on August 17, 1808, and died in Paris in 1877. He was trained as a compositor at Besançon, and became a type-founder in the employment of M. Jules Didot.

Descender.—A descending letter is one in which a part of the face goes below the bottom of the m or n. Thus p, q and g are descending letters. Out of two hundred letters counted in common matter, fifteen only were descending, while seventy were ascending. A certain proportion of ascending or descending letters adds much to the legibility of matter, as is evidenced by the difficulty with which lines of capitals or small capitals are read. In the three examples herewith, showing the value of a shoulder, one is in the way in which ordinary printing is done; another cuts off the lower shoulder, and the third both upper and lower shoulders.

> Have the mold carefully cleaned and oiled on the inside. Set it upright, with the core in its place in the centre. Then pour in the composition hot from the kettle carefully upon the end of the core, so as to run down the core.

ORDINARY WAY.

> Have the mold carefully cleaned and oiled on the inside. Set it upright. with the core in its place in the centre. Then pour in the composition hot from the kettle carefully upon the end of the core. so as to run down the core.

TYPE WITHOUT LOWER SHOULDER.

> HAVE THE MOLD CAREFULLY CLEANED AND OILED ON THE INSIDE. SET IT UPRIGHT. WITH THE CORE IN ITS PLACE IN THE CENTRE. THEN POUR IN THE COMPOSITION HOT FROM THE KETTLE CAREFULLY UPON THE END OF THE CORE. SO AS TO RUN DOWN THE CORE.

TYPE WITHOUT SHOULDER.

Des Moines, Iowa, the capital of that State, began printing in July, 1849, when the Iowa Star was brought out by Barlow Granger, who is still living. There are now published there four daily and twenty-three weeklies. There are several independent job offices, two lithographic establishments and one engraver. The State printing furnishes employment for many persons.

Desserrer (Fr.).—To unlock (a form or galley).

Detention of Proof.—On ordinary work no proof should be detained by the author or editor more than a day; nor without special agreement should he ever hold it back more than three days. Under the former way, allowing three days for composition, the reading of the first proof and its correction, a day for going and returning, a day at the author's, and a day for final reading and casting, a week is needed for a return of type, it thus requiring on small pica about two hundred pounds for each man employed; under the latter procedure, with two days more, two hundred and sixty pounds. Thus to get up a book of five hundred pages, employing five workmen, will require thirteen hundred pounds and will take over a month. But supposing that the author does not return proofs under a week, eighteen hundred pounds will be needed. There is, therefore, reason for printers objecting to the holding of proofs for so long a time out of the office, as it renders necessary the purchase of so much more type, and it is just for them to come to an understanding with the publisher and charge him demurrage after a certain time. In some cases the work cannot be done otherwise, but then there should be a clear agreement. Presses held back by customers while forms are on should also be charged for.

Detergent.—A composition or substance to take off grease or ink.

Detroit, Mich.—Printing began in Detroit in 1809, when the Essaie du Michigan ou Observateur Impartial, in French and English, was published. In 1817 another periodical, in French and English, was begun. The Michigan Herald, in 1825, was the precursor of the English press, newspapers multiplying very fast after 1850. There are now six dailies, twenty-one weeklies and seventeen other periodicals published there. There are also numerous job offices, some of considerable size, several lithographic establishments and a number of bookbinderies. Electrotyping is done in several places.

Devices, Printers'.—Printers' emblems or vignettes, serving in the earlier stages of the typographical art as trade-marks, now nearly abandoned by printers. There are, however, some printers, publishers and booksellers who still use them, and if well executed there can be no doubt that they lend a grace to the page. Examples of the devices of some of the more noted early printers are shown, together with a few of the present day, on pages 138 and 139.

Devil.—The errand-boy or youngest apprentice in a printing-office. This term is going out of use in America in common with the apprenticeship system. It is said that it is derived from the belief that John Fust was in league with the devil, and the urchin covered with ink certainly made a very good representation of his Satanic majesty. "The Printer's Devil," says McCreery, a poetical printer, "is a character almost identified with the origin of the art, and we may consider ourselves peculiarly fortunate in having a guardian exclusively assigned to us, from whom, notwithstanding his general bad conduct to other people, we have so little to apprehend, and who is commonly our faithful assistant, both in our labors and our pleasures." An early author gives the following story of the origin of the legend of the compact between Fust and the devil:

"Fust having taken to Paris some copies of the Bible, of which many, printed upon vellum, were ornamented with letters and vignettes, sold them as manuscripts at an excessive price. But the buyers, struck with the great number and the resemblance of the copies, accused him of magic. Pursued for this by justice, he was obliged to flee to Mentz. The matter was inquired into, and his innocence appearing the Parliament of Paris made a decree which relieved John Fust of all accusations and actions against him on account of the sale of Bibles, considering that they were the product of a new invention, yet unknown in Paris."

A more circumstantial account of this occurrence appears in Walkius, who published it in 1609 in Strasbourg, but this does not lean upon the magical part:

"I have heard Henry Schnore, a Belgian, and the prevost of Luburge, say that even before typography, this new art of which I have been talking, had become known and was still a mystery, a certain Fust, who had labored assiduously at Mentz upon this discovery, possessing some copies of the Bible printed by himself, went to Paris with his books in order to reap a profit from this new venture. And while before the price of a single copy of the Bible upon parchment, which a laborious and diligent scribe could not finish copying but after a long space of time, rose to four or five hundred crowns, Fust sold his at the very much lower figure of sixty crowns. Among the buyers there was at first a great astonishment at the perfect resemblance of the copies to each other, a resemblance which was such that in so immense a number of letters, in an array of text so extended, and even in the position of words, there was not a single i nor a single mark whatever that was not exactly like those in all the other volumes. All the pages, on the contrary, all the passages corresponded to each other with the most perfect regularity. No one could understand the cause of such an astonishing resemblance. Now, as the buyers were hesitating, and as the sale went off very slowly, Fust gave up some of his copies at the price of fifty crowns; finally he lowered them to forty crowns and even less. Later, those who had bought these Bibles the first, having learned that others after them had obtained from Fust the same work at a very inferior price and indeed almost for nothing, informed besides of the discovery of this new and admirable process for reproducing infinitely the characters until then written, accused Fust of having tricked them. They brought him back the work and demanded their money, pretending that he had made them pay twice, thrice or even four times the true value of his book. To wrest away their money they employed every device and left neither truce nor repose to the unhappy artisan. Returning from Paris to Mentz Fust was not even there safe from their demands, and saw himself constrained, in order to escape them, to leave Mentz and settle down at Strasbourg."

On this subject Moxon says: "The pressman sometimes has a week boy to take sheets, as they are printed, off the tympan; these boys do in a printing-house commonly black and daub themselves, whence the workmen do jocosely call them devils, and sometimes spirits, and sometimes flies." Savage, writing in 1840, says: "The boys that make the fires, sweep the rooms, assist in the warehouse and go on errands are now called devils, or printers' devils, but in the trade they are generally called errand-boys and warehouse-boys."

Devil's Tail.—The bar of a hand-press, by which the impression is taken.

THEODORE L. DE VINNE.

De Vinne, Theodore Low, of New York, the second son of the Rev. Daniel De Vinne, a minister of the Methodist Episcopal Church, was born on December 25, 1828, in Stamford, Conn. He did some temporary work in a printing-office at Fishkill, N. Y., in 1843, but soon after began learning the trade in earnest with the Gazette, at Newburgh, N. Y. The office was a very small one, and the three apprentices who were employed were obliged to do everything that the calling required. In 1847 he went to New York, where he worked at press and case in several offices with the purpose of learning different branches of printing. Hearing in 1849 of a vacancy in the office of Francis Hart, a skillful printer, he applied for and obtained a situation as job compositor. In 1850 he was made foreman there, which position he held for nine years. In 1859, an offer having been made to him of a partnership elsewhere, Francis Hart, not to be outdone, made him a member of the firm. The specialties of the house at that time were railroad and steamboat printing and general job-work. It has since changed almost entirely to bookwork. In 1861 Mr. De Vinne began to write on the subject of printing for the Printer, a journal then published in New York. His first long article was upon a subject to which he has ever since devoted much attention, the Profits of Book Composition. The second was an essay on trades unions. At about this time he delivered an address before the Typographical Society upon early printing. Soon after the outbreak of the Civil War the price of everything which entered into making an estimate, whether labor or material, became so different from what it had been in peace that Mr. De Vinne and Peter C. Baker repeatedly brought together the members of the trade for consultation upon the changed conditions. A society was formed and a new scale of prices for the public was adopted. Mr. De Vinne was chosen the secretary of this association of employing printers, serving on several important committees and doing much other work. The new society, which was known as the Typothetæ, proved valuable in allaying animosities and in giving to all its members a truer knowledge of the conditions of the trade. In 1873 the house began to print St. Nicholas, and shortly after the Century Magazine. At that time all magazines were printed upon wet paper, although a great deal of fine job-work and bookwork was done upon dry paper. Mr. De Vinne determined to attempt the presswork of the cut forms of the Century upon dry paper, and after many discouragements was successful in attaining the results he desired and in producing a more brilliant effect from fine engravings than had been thought possible. His methods were adopted in other offices, but the difficulties of printing upon dry paper were not entirely surmounted for many years. He was the first to use surfaced paper for magazine work and fine bookwork with illustrations. His firm has recently been engaged in the production of one of the largest works ever issued from the American press, the Century Dictionary.

Francis Hart died in 1877, and in 1883 Mr. De Vinne associated with himself his son, Theodore B. De Vinne, as Theodore L. De Vinne & Co. In 1885 they erected a large and commodious building in Lafayette place expressly for a printing-house, and removed thither in May, 1886. During the continuance of the war Mr. De Vinne was led to investigate the question of prices very closely, and after he became secretary of the Typothetæ many demands were made upon him for information. This suggested to him the need of a new book of authority. In 1869 he published the first edition of the Printers' Price-List, a manual intended to furnish printers facts for making estimates correctly. A second enlarged edition was published in 1871, which was warmly approved of by the trade. Mr. De Vinne's studies of printing showed him where many errors had been committed by bibliographers in attempting to solve the mystery surrounding the invention of the art. The early writers were not printers, and pursued their studies without proper knowledge of technical details. He felt that the explanation of many difficulties could alone be found by using the light cast upon them by the experience of printers. The result of his researches and reasoning appeared in the Invention of Printing, a thick octavo of 550 pages, which was everywhere received as a valuable summary of the evidences concerning the invention. The date of its appearance was 1878. He has contributed to the Century Magazine essays on the Growth of Engraving on Wood, Plantin and the Plantin-Moretus Museum, the Printing of the Century and other papers concerning typography. Upon the reorganization of the New York Typothetæ in 1883 Mr. De Vinne was elected a vice-president. Lately, upon the death of William C. Martin, he was chosen president of that organization. When the United Typothetæ was formed in Chicago in 1887 he was elected its first president, although not present. He discharged the duties of that office for the next year, and at its sessions in New York in 1888. He is a member of the Aldine, Authors' and Grolier clubs, and has done efficient service as a member of the publication committee of the last-named society.

Dextrine, known as British gum, is produced from starch by the action of dilute acids, alkalies and diastase, and by roasting it at a temperature of from 248 to 320 degrees Fahrenheit. It much resembles gum-arabic, for which it is used as a substitute. It is useful in sizing paper, for making adhesive stamps and labels, and also in bookbinding.

Diæresis (di-er′-e-sis).—A mark placed over a vowel to indicate that it is not to be united in pronunciation with the succeeding syllable. In practice, however, it is omitted where there is no likelihood of an error being made. Coëqual and aërial, and words like them, are sometimes thus marked, but the general practice is to place no accent over the letters in these, reserving the dots for words like coöperation, where a mispronunciation might easily be made. Many printers hyphenize such words, and do not use the diæresis, writing co-education and co-operation. This is the same accent which in German denotes the suppression of the e, as in über for ueber. The mark can be made in fonts which do not have it by laying a colon, from which the shoulder has previously been filed off, upon its side over the top of a letter. In Greek a diæresis may be joined with an acute or grave accent, that accent being in the middle between the two dots.

Diagonal Composition.—In job-work lines, and sometimes a number of lines, are arranged so as to be diagonal to the page. Each line is, however, set as usual, but is justified with extreme care. The arrangement having been made, the hollow places are filled in with leads, quadrats and slugs, or by plaster. If the form is in small type and likely to be treacherous it is better to work the impressions from an electrotype plate.

Diagram.—An outline; a figure or drawing made to illustrate a statement. Diagrams should only be done on time; if at all elaborate they should be drawn with pen and ink and reproduced by photo-engraving or by lithography.

Diamond.—The most diminutive type regularly cast by type-founders. It is next smaller than pearl and next larger than brilliant, a size sometimes made in Europe and by one foundry here. In body it is one-half bourgeois, or by the point system four and a half points. Fifteen or sixteen lines make an inch. It has very little utility, except for notes and references in books. Bibles and Testaments are sometimes printed in it. It is called "diamant" in French and German; "non plus ultra" in Dutch, and "diamante" in Italian.

This line is set in Diamond.

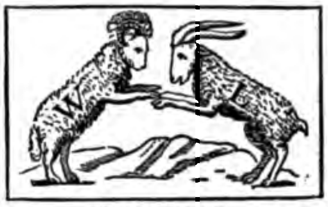
Diamond Card-Press.—A small press which was manufactured between 1850 and 1860 by S. P. Ruggles, but which is now no longer in use. Also, a press manufactured by the Hoes at about the same time.

Diamond Rule.—Rule the thickness of a diamond body.

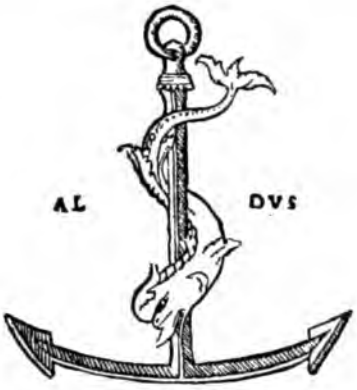
Diana of Poitiers, a favorite of King Henry II. of France, was an enthusiastic lover of good bindings, and paid much attention to the fine appearance of her books. She possessed a magnificent library at Anet.

Diary.—A book arranged in such a manner as to give a certain space to each day, week or month, so that memoranda may be made in each place. The manufacture of diaries constitutes a large portion of the business of a blank-book maker.

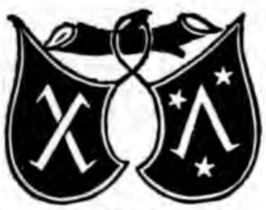
Dibdin, Thomas Frognall.—A writer who probably did more than any other speaking the English language to foster the taste for book collecting and bibliography and incidentally for finely-printed books. His father, Captain Thomas Dibdin, was the hero of the celebrated song, Tom Bowline, which was written by his brother. Thomas Frognall Dibdin was born at Calcutta in 1775, but after the death of his parents was sent home to England, where he first studied law and afterwards divinity, being ordained in 1804. Before that time he had a well-grounded education in the classics and in French, and had written for the magazines. In 1809 a volume with the title Bibliomania, brought out by Dr. Ferrier, suggested to Dibdin another with the same title, which was warmly received. The passion for the collection of books was never more active in England than during the first quarter of the nineteenth century, and Dibdin fed it with one book after another, describing the curiosities he had seen or which were extant, and giving particulars as to size, condition, price, authorship or noteworthy circumstances connected with them. The bibliomania of that day was far narrower than at this time, but it was more earnest, considering the number of collectors. The prizes were fifteenth-century books



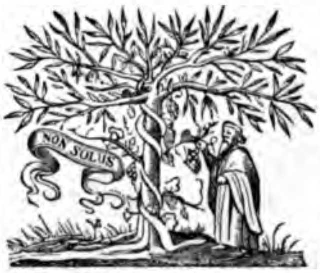
GUALTER LYNNE.
1548.



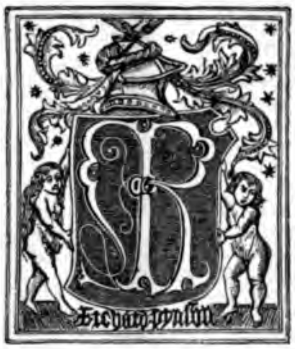
ALDUS MANUTIUS.
1520.



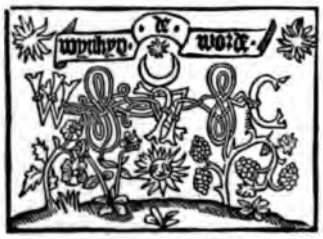
FUST AND SCHOEFFER.
1462.



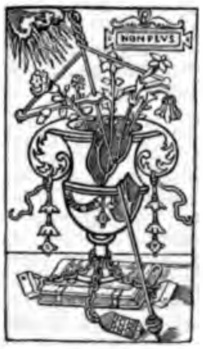
ROBERT ESTIENNE.
1541.



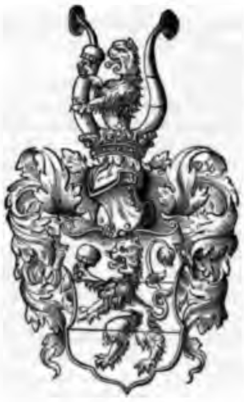
RICHARD PYNSON.
1496.



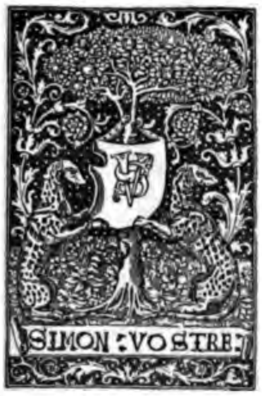
WYNKYN DE WORDE.
1495.



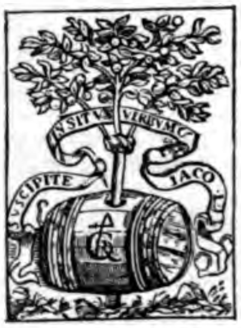
GEOFROY TORY.
1529.



SINGRENIUS.
1510.

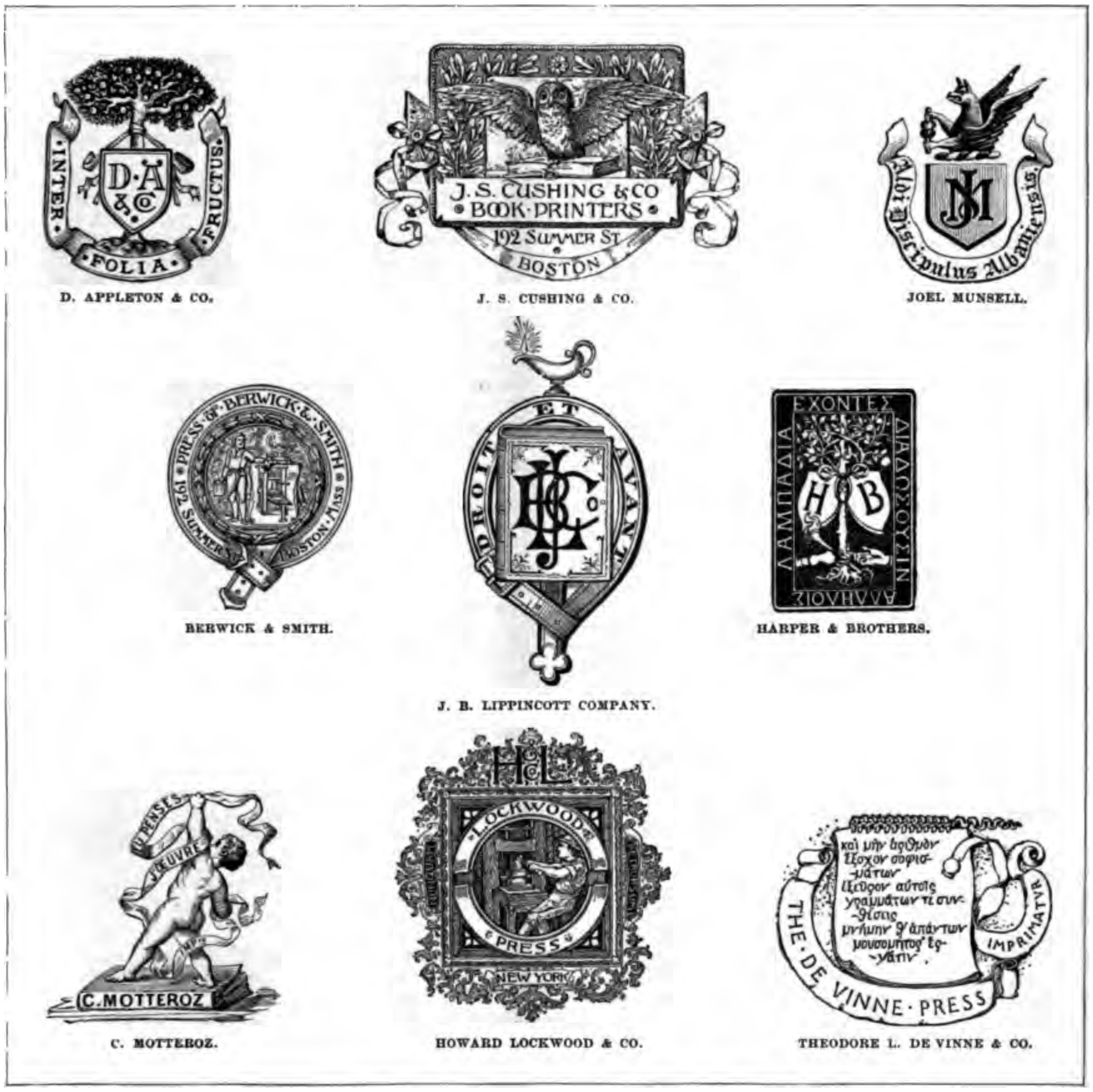


SIMON VOSTRE.
1501.



RICHARD GRAFTON.
1535.

PRINTERS' DEVICES.



D. APPLETON & CO. J. S. CUSHING & CO. JOEL MUNSELL.

BERWICK & SMITH. J. B. LIPPINCOTT COMPANY. HARPER & BROTHERS.

C. MOTTEROZ. HOWARD LOCKWOOD & CO. THEODORE L. DE VINNE & CO.

PRINTERS' DEVICES.

or those which had historical or biographical incidents in relation to the particular copy. These brought nearly as high prices as they do now; more, if the general wealth and purchasing power of mankind is taken into account. But a first folio Shakespeare, a first edition of the Pilgrim's Progress, an early Scotch book fetched nothing compared to the figures now demanded. Whole classes of books sought for by the collector were then unknown in this sense, as, for instance, Americana. Dibdin's books were very handsomely printed upon hot-pressed paper, with special copperplates and wood-engravings. The leading book was the Bibliographical Decameron, or Ten Days' Pleasant Discourse upon Illuminated Manuscripts and Subjects connected with Early Engraving, Typography and Bibliography. This was in three volumes, the plates and cuts being broken up afterwards. His books are now regarded as dull, and more complete knowledge has taken away much of their value as books of reference; yet they are still desirable in every large library. He lived to see the bibliomania to which he had ministered die out, and wrote anonymously in 1831 a book in which he deplored this fact. He died in 1847.

Dickinson, Samuel Nelson, an eminent printer and type-founder of Boston, was born in the town of Phelps, N. Y., on December 11, 1801, and learned his trade as a printer at the office of the Palladium, in the neighboring village of Geneva. With the exception of a year or two in New York, the remainder of his life was spent in Boston, where he began business about 1828. His trade increased rapidly, and in 1839 he began type-founding, having previously designed for an Edinburgh foundry a series of Scotch-cut letter. After the success of this was seen he determined to cast type for himself, and in March, 1839, brought out the first size of a series that was very popular. By 1845 he had a full assortment of types, and issued his first specimen-book. His physical ability, however, was not equal to the demands upon him, and he died from consumption in Roxbury, Mass., on December 16th, 1848. He was extensively known as a publisher, one of his books, a Help to Printers and Publishers, having for many years been an indispensable one in all printing-offices. It was issued in 1835, and contained a number of calculations showing the quantity of paper required for a given number of signatures in bookwork, with other estimates for job-work. The business was continued by Sewall Phelps and Michael Dalton, the former dying in 1863 and the latter in 1879.

Dictionary.—A book which conveys in an alphabetical order information in an explanatory way on an entire subject or branch of a subject, or which defines the orthography and meaning of words. There are dictionaries of words, facts and things. Under the first head are dictionaries like those of Walker, Webster and Worcester; the second includes history, biography, mythology, geography, archæology, and all other subjects dealing with events which have happened, or with facts which exist or have existed. The third kind includes all of the abstract sciences, the mixed or applied sciences, the departments of criticism and the fine arts, and the whole range of metaphysical and moral speculation. Some books, like this Dictionary, include all of these branches. The earliest dictionary of the English language which was regarded as an authority was that of Bailey, which Dr. Johnson took as the basis of his work. The latest edition of this is Latham's Todd's Johnson. It is valuable for the numerous examples which it gives of the use of words by apposite quotations. Richardson's carries this still farther. Webster and Worcester, both Americans, wrote the dictionaries chiefly consulted in this country, the former being much more used than the latter. Webster has generally been followed in this work. Later dictionaries are those of Stormonth, reprinted here by the Harpers; the Imperial, an English revision of Webster, and the Century, far larger than any other. Its size and cost, however, are likely to preclude its general use in printing-offices. Another dictionary, which will not be complete for years, is the New English Dictionary, edited by Dr. Murray. This is not a popular dictionary, and its greatest value to the student arises from its examples of the use of words from the time of Chaucer down to the present, with the date. Thus many apparently new words are shown to be old, and many old words are given in senses now strange. Dr. Jamieson's Dictionary of the Scottish Language, Halliwell's of Archaic and Provincial English, and Bartlett's Dictionary of Americanisms are all useful works. In German, Grimm's Wörterbuch is the most complete dictionary, and in French that of Littré. The standard used by French writers, however, is that of the Académie. A new and very large dictionary is now appearing in France. In Spain the chief authority is that of the Real Academia Española, composed in 1726, and in Italy it is the Dictionary of the Della Cruscan Academy. Proof-readers, however, very rarely need these works in foreign tongues. For French, Spiers & Surenne's Dictionary gives explanations in English; Adler's Dictionary does this for German; Liddell & Scott for Greek; Anthon, Smith, and White & Riddle for Latin, and Neuman & Baretti for Spanish. Care should be taken not to follow dictionaries in compounding. They are compiled by persons who have had little practical experience in this matter, and the same words are differently treated in different places, which, of course, the dictionaries cannot show. Dictionaries nearly always bear a higher price than plain composition. De Vinne's Price-List lays down a rule that the least difficult kinds should take at least ten cents a thousand extra. Extra sorts must be provided; the compositor's work is very slow; proofs are numerous and are out a long time, and much more care must be exercised in proof-reading. Dictionaries should always be electrotyped, even if the edition is small, as there is then no danger of letters dropping or slipping by. This is the fourth dictionary of printing which has appeared in English. The first was by William Savage, an English printer of high repute, and was published in 1840. Mr. Savage was then an old man, and condensed into his book the knowledge of a lifetime. The work is particularly full in regard to alphabets of foreign languages, abbreviations, and tables of signatures and of the price of pages. The second was by John Southward, who has now been writing for nearly thirty years upon the subject of printing, and is the editor of the Printing Trades Journal in London. It covered many more words in its definitions than did Savage's, but these definitions were compendious. By special treaty with R. S. Menamin the dictionary was reprinted in 1870 in the Printers' Circular of Philadelphia, and immediately after was issued in an enlarged form, with copious American additions, the editors being J. Luther Ringwalt and his accomplished wife, Jessie Ringwalt. It formed a volume nearly as large as this, but with very much less matter. In Germany a large dictionary of printing has been published by Alexander Waldow of Leipsic, and there is another one by Mahrahrens. No dictionary of this kind exists in France, Spain, Portugal, Holland or Denmark, but a very copious one is now being published by Henry J. Tucker in French in his Typologie-Tucker. It has so far only proceeded to the letter K, but was begun ten years ago. A dictionary was published in L'Arte della Stampa, in Italy, a few years since. There are two vocabularies of printers' words—one by Jacobi, in English, and another by Eugène Boutmy, in French. The latter is of French slang, and is full of bright expressions and witty sayings. French argot is very abundant.

Didot.—The name of perhaps the most celebrated family of printers of the eighteenth and nineteenth centuries. François Didot, the first of the name, began business in Paris in 1713, and was highly esteemed for his fine publications; he brought up his sons to the art. François Ambroise was born in 1730 and died in 1804. He made many improvements in type-founding and in the construction of machinery, and he printed among other books an edition of French classic authors with great beauty and correctness. He was succeeded by his sons Pierre, born in 1760 and dying in 1853, and Firmin, born in 1764 and dying in 1836. They continued printing handsome editions of the classics, while stereotyping was invented anew by them, and they were noteworthy for the scripts which they produced. Pierre François, the son of the founder, established paper-mills at Essonne, near Paris, and his son, St. Leger, entered upon its manufacture by the use of the machine invented by Louis Robert, and which was later improved and is now known as the Fourdrinier machine. Another son of Pierre Didot was Henri, who became famous as a letter-cutter and made the punches for the smallest type yet known, every letter being clear and distinct. A son of St. Leger, Jules, was also a noted punch-cutter. Firmin Didot was succeeded by his sons Ambroise Firmin and Hyacinthe, who carried on business as Firmin-Didot Frères. Ambroise Firmin-Didot, who was born on De-

AMBROISE FIRMIN-DIDOT.

cember 20, 1790, was carefully educated by his father, who employed the best masters. In 1814 he visited England to inquire into the manufacture of paper, and took back with him to Paris the press invented by Lord Stanhope a dozen years before, but which had up to that time been unused in France. He became an attaché of the French Embassy at Constantinople in 1815, and during the next ten years chiefly devoted himself to classical studies and travels in the East and the cause of Greek independence. In 1827 he entered into partnership with his younger brother, Hyacinthe, as Firmin-Didot Frères, but in 1840 the business had assumed such proportions that they deemed it wise to sell their type-foundries to the Société de la Fonderie Générale. He was printer to Charles X., and one of the jury at the French industrial exhibitions from 1844 to 1849, of the world's fair at London in 1851, and of Paris in 1855. At these exhibitions he was appointed reporter of the sections of printing and paper, as well as of the arts connected with them. When Queen Victoria paid a visit to France in 1855 he was selected with another colleague to receive her on the part of the city of Paris. He wrote an Essay upon Typography and a larger work upon the same subject; an essay upon the Price of Paper in Antiquity, and a Typographical and Bibliographical Essay upon the History of Wood-Engraving. As a publisher, his greatest achievement was issuing Henri Estienne's Thesaurus of the Greek Language, in eight thick quarto volumes, the time occupied being thirty-four years. Many other learned works were printed by him. He had an almost unequaled library on typography and bibliography, and his collection of manuscripts was estimated to be worth $400,000. He was honorary president of the club of publishers, printers and paper manufacturers. He died on February 23, 1876. For a hundred and eighty years this house has stood in the front of Parisian typography, and nearly every member of the family has been a man of distinction. The business is of great size.

DIMENSIONS OF PAPER.

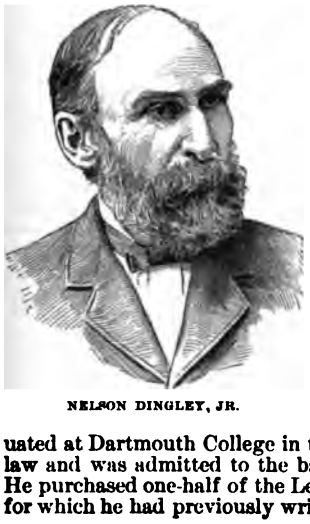
NAMES.	De Vinne.	Magarge.	Philadelphia.	English.
Billet Note (writing)	6 × 8	......	6 × 8	......
Octavo Note (writing)	7 × 9	......	7 × 9	......
Ladies' Bath (writing)	......	......	7½ × 11	......
Commercial Note (writing)	8 × 10	......	......	......
Packet Note (writing)	9 × 11	......	9 × 11	......
Bath Note (writing)	8½ × 14	......	......	......
Letter (writing)	10 × 16	......	10 × 16	......
Commercial Letter (writing)	11 × 17	......	......	......
Packet Post (writing)	11½ × 18	......	......	......
Extra Packet Post (writing)	11½ × 18½	......	......	......
Foolscap (writing)	12½ × 16	......	12½ × 16	12½ × 15½
Pot (writing)	......	......	......	13½ × 16½
Law Blank or Small Cap (writing)	13 × 16	......	......	......
Flat Cap (writing)	14 × 17	14 × 17	14 × 17	......
Crown (writing)	15 × 19	15 × 19	15 × 19	......
Post (writing)	......	......	......	15¼ × 19½
Crown (printing)	......	......	......	15 × 20
Demy (writing)	16 × 21	......	16 × 20	15 × 20
Extra Large Post (writing)	......	......	......	16½ × 21
Square Demy (writing)	......	......	17 × 17	......
Demy (printing)	......	......	......	17½ × 22
Folio Post or Folio (writing)	17 × 22	17 × 22	17 × 22	......
Extra Size Folio (writing)	19 × 23	19 × 24	......	......
Check Folio (writing)	17 × 24	17½ × 24½	17½ × 24½	......
Census (writing)	......	18 × 26	18 × 26	......
Large Check (writing)	......	......	19 × 24	......
Medium (writing)	18 × 23	18 × 23	18 × 23	17 × 22
Medium (printing)	19 × 24	......	19 × 24	18 × 23
Double Cap (writing)	17 × 28	......	17 × 28	......
Royal (writing)	19 × 24	19 × 24	19 × 24	19¼ × 24
Royal (printing)	20 × 25	......	......	20 × 26
Royal, Inferior (printing)	......	......	......	19½ × 24
Super-Royal (writing)	20 × 28	20 × 28	20 × 28	19¼ × 27½
Super-Royal (printing)	22 × 28	......	......	......
Double Pot (printing)	......	......	......	17 × 25½
Imperial (writing)	22 × 30	23 × 31	22 × 30	22 × 30
Imperial (printing)	22 × 32	......	......	......
Medium and a Half (printing)	24 × 30	......	......	......
Elephant (writing)	22¼ × 27¾	......	......	23 × 28
Royal and a Half (writing)	......	......	25 × 20	......
Double Crown (printing)	......	......	......	20 × 30
Columbier (writing)	23 × 33¼	......	......	24 × 34½
Atlas (writing)	26 × 33	......	......	26 × 33
Small Double Medium (printing)	24 × 36	......	......	......
Double Medium (printing)	24 × 38	......	24 × 38	......
Double Demy (printing)	......	......	......	22½ × 35
Double Elephant (writing)	26 × 40	......	......	27 × 40
Double Royal (printing)	26 × 40	......	......	......
Double Super-Royal (printing)	28 × 42	......	......	......
Double Super-Royal (writing)	......	......	27 × 42	......
Broad Twelves (printing)	23 × 41	......	......	......
Double Imperial (printing)	32 × 46	......	32 × 44	......
Antiquarian (writing)	......	......	......	31 × 53

Die Stamping.—The art of stamping in relief by means of steel dies. This is frequently used for note-paper and envelopes.

Diesis.—The mark ‡, known as the double dagger.

Dimensions of Paper.—Paper is now made of all sizes, and any width desirable can be produced upon the machine, some intended for daily newspapers being as wide as seven feet, or two newspapers, the press printing two copies at once, while in length it may be many miles. Such rolls of paper, however, were not made before the introduction of web presses, and the largest sheet regularly made previously was about 40 by 60 inches, although single editions of newspapers have been produced on sheets four times this size, the paper having been folded and refolded, so that each part could be placed upon the press. In the beginning of the art the size of paper was not much in excess of foolscap, and the newspapers in Great Britain and the United States at the beginning of this century were of about the size of two pages of Harper's Weekly, but a little wider. In London in 1790 daily newspapers were of sixteen columns; in 1810 they were of twenty columns. There was much uniformity in British sizes, as they were taxed according to dimensions, and the customs officials compiled a table showing the exact limits. Up to the present time, although any size of paper can be bought in England, each of them has a characteristic cognomen among the trade, while here the specific names are nearly all lost in common usage, the only names for book-paper now preserved being medium, double medium and super-royal. Even these do not convey the same significations to all persons, so that the common method of designating paper on orders is by inches. The kind most used in books is 24 by 38, which prints on one side sixteen pages of octavo, and which cuts up conveniently for job-work. A larger size, 28 by 42, is that now generally employed for posters; 32 or 33 by 46 is used by illustrated newspapers, and 23 by 41 is the usual size for duodecimo. The papers which are in common use in a printing-office are writing and printing papers, and writing-papers are divided into folded and flat papers, the smallest sizes being folded. The sizes given by De Vinne in his Price-List; by Charles Magarge, a large paper dealer in Philadelphia; the usual sizes in the Philadelphia paper trade, and the English sizes are here tabulated. For the figures of Magarge and of the Philadelphia trade we are indebted to Ringwalt's Encyclopædia.

Other sizes are also known, varying somewhat from these. Thus in Magarge's dimensions flat cap is 14 by 17, 13 by 16 and 12 by 15, and the other Philadelphia dealers give 12½ by 15½ and 13½ by 16½. The latter assign the name note to a size the same as billet; they make various sizes of foolscap, give a larger size of imperial, 26 by 32, and make double medium vary from 23 by 36 to 24 by 37½. Letter-paper is in New York sometimes 9¾ by 15½ inches; commercial letter, 10¾ by 16¾ inches; foolscap, 12 by 15 inches; extra size folio, 18 by 23 inches and 19 by 24 inches, and imperial, 23 by 41 inches. In ordinary paper, sheets of large dimensions require to be heavier and stiffer than the small sheets, as otherwise they do not feed and deliver well. Large sizes are known by the use of the word double or quadruple. Flat writing-papers can often be bought of double the dimensions given above, and where they cannot be purchased at once the mills will make them. A great economy in presswork will frequently result from this expedient.



NELSON DINGLEY, JR.

Dingley, Nelson, Jr., a printer and publisher at Lewiston, Me., was born at Durham in that State on February 5, 1831. He was graduated at Dartmouth College in the class of 1855, studied law and was admitted to the bar, but never practiced. He purchased one-half of the Lewiston Weekly Journal, for which he had previously written the leading articles, in September, 1856, and became sole proprietor a year later. A daily edition was begun in April, 1861. Its circulation and influence rapidly increased. He was chosen Speaker of the Maine House of Representatives in 1863, having previously served two terms, and was re-elected Speaker in 1864. He remained in the Legislature until 1872 and the next year was elected Governor by a large majority, serving a second term subsequently. He was elected a Representative to the Forty-seventh Congress in 1881, and has been a member of the succeeding Congresses. He is regarded as a leader of the House, and has taken a prominent part in shipping, tariff and currency questions. He received the honorary degree of LL. D. from Bates College in 1874. He still is active in the management of his business, which embraces a very large book and job office as well as the newspaper.

Diphthongs.—Two vowels united, as æ and œ. They are chiefly from the Latin. Many classical books at the present day, however, spell out these letters, as Caesar for Cæsar. In the Bible some of these words are spelled with only one letter instead of the diphthong, as Cesar.

Direction Line.—The line the direction stands in; the catch-line. Obsolete.

Direction Word.—The word which stands alone on the right hand at the bottom of a page; the catchword.

Directory.—A list of names of persons, with their residences or places of business or both, or books intended to serve for guides to a business, or occupation, or locality, arranged methodically. The first directory is said to have been that of London in 1732. It contained only business names. The originator of this work was James Brown, a native of Kelso, in Scotland, who, after laying the foundation, gave it to Henry Kent, who carried it on with profit. The earliest American directory was that of New York in 1786. It was printed by Shepherd Kollock and compiled by David Franks, an Irish accountant. Less than one thousand names were given, all in business or public life, the population of New York then being about thirty thousand. It was omitted one year before 1790, but has since been carried on up to the present time, chiefly by two families or firms, that of Longworth after 1795, and Trow since 1852. Other cities promptly imitated the example, and for the last forty years directory work has formed a very large class of the business of printing. The first New York business directory and the first copartnership directory of New York were issued in 1840. Directories of selected names, under the title of élite directories, have now been published for about twenty-five years. Books of this kind, referring to various trades, occupations, tastes or studies, are very common. More than a hundred and fifty special directories must now be published annually in New York, and a great number in other cities. A general directory is one of the most trying pieces of composition which comes into an office. It must be done in a hurry, as otherwise a large part of the year will be lost, and an opposition directory may be published first; it usually requires nearly the entire capacity of the printing establishment in which it is done, and the foreman is obliged to employ an extra number of hands, the latter being picked up anywhere, and usually being as worthless as they can be; a large quantity of type is required, and the pressroom must be so managed that one form shall succeed another without intermission. In these books there are two parts; one is the directory proper, and the other a register or list of the city officials, churches, streets and other matter requisite for completing the information contained in the volume. The latter part is set first, and put out of the way before the list of names begins. There are also advertisements. If these go on every page, or every fourth or eighth page, they should be set up and electrotyped, with solid backing, so that no time may be lost in making up the pages. In directory offices the special men engaged are notified to appear on a certain day at a certain hour, their cases having previously been thrown in. Situations will not be kept for them if they are late, and an absence of two hours in most places will forfeit a situation. It will rarely ever be necessary for compositors to work nights if proper regulations are observed. Copy is given out in small takes, not more than a couple of stickfuls, and the men have nothing to do with the proving of galleys. Printed directions and samples of style are given to each of them. As fast as a galley is read it is corrected, revised and corrected, and then passed to the make-up. If in a very large city, the book consequently being a great one, the pages are probably electrotyped. This enables the type to return more quickly, the make-up is more easily accomplished, and there is no danger of type dropping out. The first make-up takes the galley, looks at the proof and the type to see that no matter has been omitted or repeated, but paying no attention to other errors, puts his head-lines and the advertisements at the left side upon his make-up galley, fills up the length with the matter which is ready, and passes the galley to the next make-up before he proceeds to justify his page, place the advertisements at the foot or right side or tie it up. By the time it is tied up and slipped upon the stone the second make-up has taken from the galley what he needs and it has returned to the first one. In cases where still greater expedition is needed, each revised galley, after verification against the proof for outs and doublets, can have a heavy brass rule dropped in where the page begins and ends. There is a numbering at the head of the galley, showing its relation to those which have preceded it, in the best form a numbered brass slug. The matter can be divided thus: The first man verifies and divides; the second man empties each page upon a small make-up galley by itself; the third puts on headings, side advertisements and foot advertisements; the fourth justifies and ties up. By doubling or tripling these last two men it would be quite possible to make up a Chicago or New York directory in two days, or even less. Upon the stone any number of men can be employed, according to the emergency of the work. When a directory is printed from the type swift and accurate stone-men are required, more so than where electrotyping is done. It has not been found practicable on American directories to save lines from the previous year, the changes being too great, but this is done on English directories.

The chief difficulty in getting out directories promptly in good offices is bad preparation of copy. All names and addresses should be written clearly and just as it is intended to have them go in. If there is any defect they should be written over again. Each name is on a single slip of paper from four to six inches wide, and from an inch to an inch and a half in depth. Each slip should exactly match every other slip. As fast as the first canvasser comes in the names which he has taken and which are correct should be cut out of his little book and classified, while those which are wrong or doubtful should be given to some one to rectify or to the canvasser himself to make right. It is best first to distribute in four or five heaps, and then each of these into five or six, thus completing the alphabet.

When the alphabet is finished the separation of the letter A can proceed on the same plan. The alphabetizing is carried out to the last letter, Livingstone coming after the last Livingston, and McPheeter being before McPheeters. Andrew Martins follows Zelotus Martin. The second name is just as strictly alphabetical as the first, the second middle name or letter following the same rule. Thus John, John A., and John A. G. are in the order given. Mc is placed in the same order as if spelled out as Mac. When the A is completed the different slips are pasted upon sheets of paper just as wide as the slips, and as soon as they are dry and numbered it is usual to give them out. If in a medium-sized city, where a press can be kept for it alone and the edition is two thousand, three forms can be worked daily. If these are sixteen pages of ordinary octavo in long primer a dozen compositors must be provided and one hundred pages of type will be enough. Extra sorts will be required. The New York Directory requires ten thousand pounds of type, and a hundred pages of the octavo in nonpareil are composed in a day.

A form of the directory little known here, except in élite directories, is common in Europe. It has the street as a heading, the number of the house at the left, and the address in the same line, but following the number. The following is the style:

SUFFOLK STREET.

27 Mr. John Ellinwood.
28 Mr. and Mrs. Montague.
29 Henry Jones, Esq.
30 Miss Ellen Blamin.

Such directories are of great value in sending out circulars or letters.

Diploma.—A certificate of graduation or of excellence issued by a school, college or public body. It is usually of ornamental typography, when not engraved, and requires much care in printing. The best and most expensive diplomas are on parchment.

Diptych.—A tablet of wood or metal, in two parts, which folded together, used by the Romans.

Directing Newspaper Wrappers.—See under MAILING.

Dirty.—This is said of a compositor who regularly has bad proofs, or it is said of the proofs themselves, as dirty compositor, dirty proofs. It has no reference to the physical condition of the man.

Dis.—An abbreviation of the word distribute, used in English printing-offices.

Diseases of Printers.—See HYGIENE.

Dished.—A defect in electrotyping, the centre of a letter or of a page being lower than its edges.

Disimporre (Ital.).—To take away the furniture of a form.

Disinterlineare (Ital.).—To unlead.

Display.—To place types of various kinds or sizes in due relation to each other in a job or piece of composition. Each kind of job has its own requirements, to which the display should conform. In a poster the letter should be heavy, so as to be read from a distance; but in a letter circular it should all be light. Except in those cases where only one kind of letter is used of larger and smaller sizes there should be a considerable variety, and most job hands lay down as a rule that the same kind shall not be employed twice in the same job, except where it is a heading. The space being known as to length and width of page, the compositor examines the quantity of copy to know what size of type to select. In an octavo page, with fifty words, the smallest letter would probably be brevier, and type as large as great primer could be taken for the principal line. This page would be profusely leaded. If one hundred words, nonpareil would be the smallest type, and most of the display would be in long primer, pica and brevier. With two hundred words fewer lines would be displayed, which must be done in long primer, nonpareil and brevier. With four hundred words some solid paragraphs must be arranged, comparatively few leads can be used, and pica would make the principal line, if it was long enough. With eight hundred words nearly all display must be abandoned.

In setting the lines the principal line should first be chosen. It must be above the centre of the page, and preferably one-quarter or one-fifth from the top. It ought to be, other things being equal, the largest and longest. The next line is then selected, according to its importance. It is generally below the centre. Then the next two or three important ones, and afterwards all which require much emphasis. Each one of these lines should be different in style of type from the others, and should differ also in length. The unimportant display lines follow, and finally the text. From one-quarter to one-half of the whole space in light jobs is taken up with leads and slugs. If the copy is likely to fill the page pretty closely the text should be first set and then the display lines. The following rules, drawn from many sources, are among those which should be observed:

Never crowd a long line of words marked for prominent display into one line of type, if to do so you have to use condensed or not easily read letter. Put the words in lines of the same size and style of type.

Ornamental letter should be sparingly used in advertisements or in legal or mercantile work.

The plainer faces of black-letter and pointed texts can be used in the display of law and church work, but they must be used moderately and with discretion.

Never use script, card texts or any type with large shoulders and long ascending and descending letters on any work in which the space is contracted and which does not allow a liberal use of leads.

Even in ornamental work use ornaments and ornamental letter sparingly. They are not ornamental when used in excess or inappropriately.

As a rule, legibility is wanted oftener than ornament. Plain faces have more admirers than fancy letters.

When a bold display is wanted in a crowded space use small, plain and heavy type for the text letter.

For color-work in bold display select antique, Gothic or other plain but heavy faces for text as well as for display.

When the copy for text is scant set the text in a fat or expanded letter.

If the copy is underscored too much give the leading lines full prominence and reduce the size of the minor lines of display.

You will seldom go wrong in selecting small type for the text of a job which is marked for plenty of display. A fault too often made is by selecting for text a type so large that there is no room for display or leading.

Leading lines should never be divided by hyphens. They generally appear to most advantage in capitals. A line or word of black-letter capitals is not in good taste. Condensed letter thin or hair spaced is very rarely permissible. A distinction should, however, be made between those styles which are really condensed and those which are only called condensed. There can be no objection to hair spacing a condensed Clarendon where this condensation is moderate. Display lines of close-fitting capitals will often need special spacing when used with solid matter. In Gothic styles an N and a B will come too near, while an L and an A will be too far apart. In such a case as this, if the letters are spaced apart with four-em spaces a hair space would be enough between the L and the A, while between the other two letters a thick space should be used. Lower-case letters should rarely be spaced. Wood type can be spaced with leads. Each displayed line should have about it a relief of small text type or of white space. Large types should not be huddled together. As there can be no good display without relief, display lines should be so arranged that the relief of small text types will not be all at the tail of the work, nor all of the contrast of white space at the end of lines. Distribute display lines equally all over the entire work, so far as simple and orderly arrangement of the copy will admit. If more lines in copy are marked for special lines of display than can be put in the space assigned, and if these lines consist chiefly of a few short words, set them with the prominence desired, but justify some of them in the centre of the text or as side-heads with text about them. When display is to be open, like that of a book title, there being more space than matter, never let a single text line fill the measure. Make two short lines of the text words, the second line shorter than the first. In all open display bits of texts which make three or four lines should never be set in paragraph style, with paragraph indentation at the beginning. They should be set in staircase indentation, the first line the largest, the next shorter at each end, and so on. When a border is used, avoid putting a full line at the head of the matter and next to the border. When a great amount of matter is to be put on a large page, with much display, some of the text, especially if it can be put in small type, should be put in double or triple columns; the latter if the type is very small and the measure very wide. In selecting ornamental bits of border to grace type prefer the lightest and most open faces with delicate hair lines. Never select for this purpose any ornament which is as dark as or darker than the type near it. Never shorten or crowd a line or reduce or increase leading to the injury of neat display for the sake of getting in an ornament. A curved line may sometimes be used with good effect at the head of very open matter where it is desirable to fill up space, or around a circular or semicircular cut or ornament. It should not be used either in regular or serpentine form in the middle or at the foot of text matter. An exception arises where there has been a curve at the beginning, which a new one will to some extent balance. It should never be used with close or solid matter. The curved line is of advantage only in very open display work. Never turn for sorts when you have choice of other letter. An expanded letter should always be widely spaced. A line of capitals of an ordinary thick letter should have two spaces between the words. Effect in display is brought about by contrast. A line of great primer Gothic will look very small on a poster, but very large in an ordinary business card. In poster-work it is usual to have all principal lines full, distinction of lines being secured by the use of rules. Imprints on jobs not in book form should be very small. Ornaments to lengthen the lines should be used sparingly. They do not really serve this purpose, but they help to take away the appearance of great blanks. In books all types should either be Roman or old style. They should not be mixed. The true workman should carefully examine all of the work which comes within his range. An example of most styles and varieties of job-work can be seen in Bishop's Specimens of Job-Work. See also under INITIALS.

Display Lines.—The lines in which fancy or ornamental type are used, as contrasted with plain Roman faces.

Display Type.—It is said the ornamental faces and sizes now used in job-work amount to about nine thousand. The early printers had nothing in the way of display type except their scripts and peculiar black-letters. Nor did the number increase very rapidly until after 1820. Then the antiques, and still later the Clarendons, came in. At present, owing to the facility of reproduction afforded by the electrotype process, a new face can scarcely appear in any quarter of the globe without being repeated elsewhere. Each letter in Roman has a certain definite form, and is composed of one or more strokes, which may be either horizontal, perpendicular, inclined or curved. These are of three thicknesses, the heavy lines in capitals, the heavy lines in the lower case and the light lines in both. In cases where this is possible serifs or small finishing strokes are added. In Clarendon the form is modified, so that all lines are made heavier, the characters looking much like crushed letters. In antique every line is made of a uniform thickness, and the serifs are also increased. In Gothics the serifs are omitted, but the main strokes of the letter are of the same magnitude throughout. By increasing or diminishing the weight of certain strokes or making them of a new angle many additional styles can be made; the face can be either heavy, light or medium; it can be wide or narrow, and it can have the serifs lessened or exaggerated. On these lines alone over a thousand faces are made. Going beyond them, there are those styles in which there is a studied irregularity, or in which there is a disposition to follow fancy rather than precedent. These have been multiplied beyond number; they run up into many thousands, and are likely to further increase. Some of the very best faces made have been designed within the last two or three years, proving that invention is by no means exhausted. Most type is now brought out by series. After a few letters have been cut, their impression producing a favorable effect upon the eye of the founder, the order is given to finish the font. The designs frequently are of only a letter or two, but sometimes a person outside of the trade draws for the founder a whole alphabet. The first punches being satisfactory, a series is ordered. This may be in four sizes, or it may be in ten or eleven, but the public rarely sees one until the whole is completed. Perhaps more display faces are made in pica than in any other size. Small capitals are not usually cut for fancy faces, and if there is an Italic it is a separate font. Neither are unusual letters or reference marks made, although founders are usually very obliging in this respect, and will make whatever character is needed. Spaces and quadrats are not put up with these fonts except by special order, and they are generally made with a very small shoulder, so that other type can be brought up close to them. The usual divisions are light-face, heavy-face, extended, expanded, extra extended or expanded, condensed and extra condensed. There is no rule among type-founders for naming these styles, each doing as seems best to him, and it is, therefore, almost impossible to remember the terminology. Many are known only as Ornamented No. 52 or No. 117, or some other figure.

Displayed.—Having various kinds of type properly chosen, arranged and spaced is to have a job well displayed; a bad arrangement or choice of type leaves a job badly displayed.

Disserrare (Ital.).—To unlock a form.

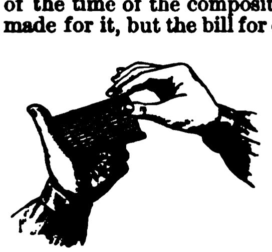
Distemper.—A preparation of opaque or body colors with size instead of oil. The early block-books were printed in distemper.

Distribuer (Fr.).—To distribute.

Distribuire (Ital.).—To distribute.

Distributing-Machines.—See TYPESETTING-MACHINES.

Distributing-Rollers.—The rollers which take the ink from the vibrator communicating with the ductor. The rollers have a diagonal movement, and distribute the ink on the table. They are sometimes called wavers. —*Jacobi.*



DISTRIBUTION.

Distribution.—1. The act of conveying back to the case the letters which have been withdrawn from it by composition. This generally requires about one-fourth of the time of the compositor, no separate charge being made for it, but the bill for composition being that much higher. In small offices the compositor usually takes his type to distribute from a stone or letter-board in the centre of the room, but if it is a large one he puts sufficient on a galley to last for an hour or more. It is requisite that the type shall be well washed, having neither a slippery nor a gritty feel. The latter indicates that foreign substances have entered into the lye or rinsing water, and the latter that the lye has not been all washed off. In this case little holes will be eaten into the first two fingers and the thumb, owing to the caustic nature of the lye. If thoroughly rinsed this cannot happen. The type should be well wet, but not sufficiently so to drip very much. Resting the left wrist upon a piece of sponge, a word or two is taken off and dropped letter by letter into the boxes, the hand being carried as far as the boxes, except those of the upper case. If thrown in from a distance letters are liable to rebound from the place where they first touch and lodge in other boxes. This practice also injures the type. Speed is gained in distribution by increasing the size of the fingerful, by certainty in knowing what letters are going out and by keeping the compositor's mind upon his work. If a compositor thinks that he is distributing the second letter of the word case when he is really distributing the first letter he will put the c in the a box, the a in the s box, the s in the e box, and he will not discover his mistake until he notices the e which will be left in his fingers. Speed in distribution is about three times as great as in composition, justifying being saved and the hand not actually entering the box. On daily newspapers in New York women are employed more or less as distributers, thus allowing men whose cases are low to come down late. They are paid by the compositors at one-quarter the rate of composition. On each daily paper there is also an objectionable man, who is employed by all of the workmen taken collectively to distribute Italic, display heads and unusual sorts. He is paid by an assessment on each man. In addition, he keeps the savings-galley, a place where heads, tables and other matter which is constantly being used are put away for the men who desire to pick them up. In job offices a boy or man is frequently employed for his whole time in distribution. Dead jobs are put in some particular place. He takes them up, unlocks the form, puts the furniture and quoins away and then distributes what is left. The plain matter he may tie up, so that those who are employed upon it may have it at their disposal, but all rules, leads, slugs, quotations and fancy type are distributed by him. He knows where every case is and the scheme for each of them, and if anything goes wrong he can be called to account. Most printers regard this as a very advantageous method of clearing away type. See also under COMPOSITION. 2. The separation of ink into fine particles, so that when applied to the type it may be evenly spread. The coloring matter of the ink and the varnish which holds it together become clotted, hard or unequal, and the distribution is necessary in order to break it up into smaller particles. See INK and PRESS.

Distribuzione (Ital.).—Distribution.

District of Columbia.—When the tract of land now known by this name was given to the general government it was all in farms, except a very diminutive settlement at Georgetown. As soon as it became the seat of authority the business of printing began there, but not for many years did it approach its present magnitude. Four hand-presses and a dozen compositors did all of the work for Congress in 1815, but the amount has steadily increased ever since, until its value is now in the neighborhood of three millions of dollars a year. The Government Printing-Office is believed to be the largest in the world. Private printing is also carried on, but as the wages of compositors are kept at a preposterous height by those who are employed by the government they compete with difficulty with the trade in Baltimore and Philadelphia, which is not thus hampered. There are five daily, twenty-three weekly and sixteen other periodicals printed in the District.

Divinity Calf.—A dark-brown calf, generally used for religious books, and worked without gilding.

Divis (Ger.).—A hyphen.

Diviser (Fr.).—To divide.

Division.—The separation of words into syllables, so that part of a word can go in one line and part in another. Unless very bad spacing is resorted to it would be impossible to space out all words which cannot be brought into the line, and it has therefore become the custom with printers, as it was before their day with scribes, to separate words into syllables, and to place one of these in one line and another in the next. The general length of a word is about two ems and a half or three-quarters, and it averages about two syllables. The length of a syllable would then be about an em and a third, and on most measures this can easily be thin spaced in or driven out. Some words, however, generally monosyllables, such as length or strength, have three or more ems in a single syllable, and there are a number of syllable divisions where printers' customs do not admit of separation, such as a-mong, upon one letter, or upon an unaccented syllable which is pronounced at the same time as the rest of the word, as lov-ed. It is therefore constantly a question with a good workman how he shall avoid bad divisions, at the same time spacing properly. Many workmen go back two or three lines and run over their matter to prevent bad divisions or spacing. There are several theories also as to the method by which divisions shall be made. One author, like Webster in his dictionary, divides upon the pronunciation. The syllable begins and ends with the impulse of the voice, and pays no attention to anything else, as fath-er, bish-op, proph-et. Another writer divides upon the vowel, as ra-ging, fa-cing, sla-vish. He pays no attention to the etymology, while a third author divides entirely upon the latter plan, separating his words sym-ptom, pro-sperous, apo-strophe. Most division in English offices is done upon an accommodation of the last two plans, inclining to the vowel. It is this system which Johnson preferred. Americans usually follow the sound theory, more or less modified. In practice, every printing-office must adopt some dictionary as an authority, unless it happens to have an extremely well-settled system of its own, for the compositors cannot spell and divide without rule, and then be compelled to change in deference to some whim of the proof-reader, nor can the latter individual, without some assistance, remember all of the words he should know. It is to be hoped that the authors of future dictionaries will be able to lay down simpler and more consistent rules than now prevail, so that the eye shall not so often be offended. So far as rules can be adhered to, the following represent excellent modern usage in printing-offices:

1. Words cannot be divided upon a single letter, as a-bide, a-dorn, fluff-y.

2. Words of four or five letters, making two syllables, cannot be divided unless the measure shall be narrower than sixteen ems. This excludes up-on, fer-ry, ad-opt, dir-ty.

3. No more than three divisions at the end of a line can follow each other in any case, and two divisions are to be avoided.

4. The best divisions are those in which two separate words are joined, or where a distinct affix or prefix is united with another word, as un-even, contend-est, dis-ease, de-throne.

5. A couple of letters, united in sound with the part of the word before, although in etymology a distinct syllable, cannot be divided, as call-ed, curv-ed. When these are pronounced, as in wretch-ed, bolt-ed, they can be divided.

6. The terminations chion, cial, cion, cious, sion, tial, tian and tious ought never to be divided. They make two syllables only to the eye.

7. Where an original word is followed by ing, and there is only one consonant, with or without a silent vowel, at the end of the original word, the ing forms a separate syllable, as bak-ing, fac-ing; but where the final consonant doubles, as in flat-ting, run-ning, the double goes into the second line.

8. Where the word will permit it is better to divide in the middle than at either end, as soci-ety, instead of so-ciety or socie-ty; sylla-ble instead of syl-lable; loga-rithms instead of log-arithms.

9. Where two consonants come together which make an easy union, and which frequently begin words, they ought not usually speaking to be separated, as fa-ble, sti-fle, instead of fab-le, stif-le; but when they come between two vowels, and are such as cannot begin a word, they must be divided, as ut-most, un-der, in-sect, er-ror, cof-fin.

10. Two vowels which are not a diphthong can be divided into separate syllables, as cru-el, deni-al.

11. Compounded words should be divided on their originals, as glow-worm, ice-house, never-the-less.

12. A word cannot be divided in the plural which cannot be divided in the singular, as cop-y, cop-ies; rul-er, rul-ers.

13. The letter y should not begin a line, unless followed by a vowel to which it acts as a consonant. Thus un-yielding is admissible, but not synon-ymous.

Divisorium.—An article used for holding copy on the case, which will permit the copy to be adjusted line by line to avoid outs or doublets.—*Jacobi.* The common name here is a guide.

Do Up.—A general term of bookbinding in England for folding, stitching and wrapping, or binding in cloth.

Doane, Algernon Sydney, general agent of the Gordon Press Works, was born on October 8, 1834, studied law and then became a patent agent. Afterwards he entered the employment of his uncle, George P. Gordon, and on his death became general manager and trustee of the estate, remaining so till his death on March 31, 1888. His knowledge of the press-building art was great; he wrote repeatedly on this subject in the trade journals, and his knowledge was ever at the disposal of others. He formed a collection of Franklin portraits which was almost unequaled, but which was dispersed at his death.

Dobson, Thomas, a Scotchman who removed to Philadelphia shortly after the Revolution, and began as printer and publisher. He was, so it is said, the only printer in the city who could read Greek and Hebrew critically. He will be chiefly remembered by the cyclopædia known by his name, a reprint of Rees's, but with American additions. This was a work of more magnitude for Philadelphia or New York at that day than the Century Dictionary or the Encyclopædia Britannica would be now. In the end he was unsuccessful, and he died early in the century.

Doc.—A slang term for the weekly bill of English compositors, evidently a curtailment of document.

Doc Sheet.—A contraction of document sheet, in some English offices the workman's time-ticket.

Dodger.—A small handbill, originally used in the theatrical and show business.

Dogseared.—A leaf or leaves of a book turned over and bent back like a dog's ear.

Dolet, Etienne, a printer whose unhappy fate has long excited sympathy mixed with anger, was born at Orleans, in France, on August 3, 1509. He studied in Paris and at the University of Padua. After this he became the secretary of the Bishop of Limoges, who was going on a special mission to Venice, and after his return he studied law at Toulouse. Here his free utterances occasioned his imprisonment, but shortly after his release by the efforts of his friends he was sentenced to perpetual banishment from the city. He obtained employment as a corrector of the press with Sebastian Gryphius, at Lyons, and there he obtained permission from the king to print his Commentaries on the Latin Tongue. In 1530 he obtained permission to carry on the calling of a printer, and published during that year a book which was vigorously denounced as heretical. He was repeatedly in trouble with the law on account of the non-agreement of his works with the tone of the theology of the day. He was arrested for heresy in 1543, and was tried before the Inquisitor-General, the trial lasting from August till October. The sentence was then pronounced that he should be burned at the stake, but, powerful friends coming forward, he was pardoned by the king. He escaped to Piedmont after his release, as malevolent influences were still at work, but attempted to return to France and was arrested. He remained in prison for two years, being repeatedly brought before the judges to extract a confession. On August 2, 1546, sentence was pronounced upon him for blasphemy, sedition, and exposing for sale prohibited and condemned books. He was taken in a cart the next day to the Place Maubert, Lyons, where a gallows was erected. After being hung he was thrown into a fire, with his books, and there consumed to ashes, all property in his possession being confiscated by the king. His rank as a printer does not appear to have been high, but he was among the first conspicuous sufferers for the liberty of printing. His works, judged by present day standards, were not inconsistent with his belief or that of the country, but dissent even in small particulars could not be allowed.

Dollar Mark.—A mark placed before figures to indicate that they represent a certain number of dollars, as $970. In Spanish this mark stands at the end, as 900$. Fractions of a dollar are indicated by placing the cents after them, separated either by a period or an en quadrat, and rarely by an en leader upside down, but never by a comma. Some printers separate the dollar mark from the figures by a thin space, but the best usage seems to be against this.

Domesday-Book.—The register of the lands of England framed by order of William the Conqueror. It was printed in 1783 in fac-simile, as far as that could be done with types, many contractions having been cut especially for it.

Donatus.—A boy's Latin grammar, which derived its name from its author, a Roman grammarian of the fourth century, and which was frequently printed at about the time the art of printing was discovered. It is the only block-book without pictures which is now known. When printed in the largest letters it occupied thirty-four pages; in the smallest it required nine. All early copies from the press were printed on both sides. The book was subsequently printed from types, and pictures were used with them.

Doppieggiare (Ital.).—A slurring or mackling of the sheet.

Doppio (Ital.).—Composition done twice, as for color forms.

Doppio Canone (Ital.).—There are two sizes of this, one being body forty-eight and the other body fifty-six on the Italian system. The magnitude of the former is body fifty-one and the other body sixty on the American point system, or five and six lines long primer respectively.

Doppione (Ital.).—A doublet.

Doreurs (Fr.).—Gilders.

Dorrington, William, editor of the Press News of London, England, and the senior of the journalists who wrote upon the subject of printing, was born in that city in 1815. He was apprenticed at the age of thirteen to a printer in Hertfordshire, where he did everything which a boy could do, including nursing the baby of the family. At the end of eighteen months his master failed and he returned to London, where he was again apprenticed. When his time ended he set type, reported and wrote stories for newspapers and prepared pantomimes. Later he was a printer of newspapers. In 1863 he became the editor of the Printer's Register, the first regularly published printer's periodical in Great Britain, and continued so till the close of 1865. At the beginning of the next year he began the Press News, a journal devoted to printing and journalism, which he has continued to the present time. He celebrated his golden wedding in 1888.

Dotted Figures, 1̇ 2̇ 3̇ 4̇ 5̇ 6̇ 7̇ 8̇ 9̇ 0̇, are used for the same purpose as scratched figures, to indicate that both dividing and divided figures have been used, and may be thrown away.

Dotted Letters.—Special letters cast with a dot above, as: ȧ ė i ȯ u̇.

Dotted Quadrats.—A former name for what are now known as leaders. They appear thus: . . . .

Dotted Rule.—Brass rule with the face dotted, used for filling up blanks, receipt forms, &c., and to serve as a guide for writing on, thus: ....

Double.—Words repeated in composition by error; also used by pressmen when a sheet is pulled twice or mackled. Americans use for the former meaning the word doublet.

Doublé.—The ornamented inside of the cover of a book, made with tooled leather, silk or other material. These are frequently very elaborate.

Double Broad.—In England, furniture eight picas in width—double the width of broad.

Double Cases.—Cases specially made, upper and lower case in one, used for small jobbing-fonts. This is the English usage; in America they are called job cases. A double case here would be two complete cases united in one.

Double Columbian.—A size of type very rarely made. It is four lines of brevier, and is between double English and double great primer. Two lines and a quarter make an inch.

Double Columns.—A page divided into two columns. Double-column matter is where the measure extends across the width of two columns, and traverses the space which would be otherwise taken by a dividing rule or reglet.

Double Crown.—A size of printing-paper used in England, 30 by 20 inches.

Double Cylinder.—Presses which have two cylinders over which paper is fed to one form.

Double Dagger.—The third of the reference marks, being used next after the dagger. It is shown thus: ‡

Double Demy.—A size of printing-paper, 35 by 22½ inches.

Double Elephant.—A size of writing or drawing paper, 26 by 40 inches in size; in England, 27 by 40.

Double English.—A size of type larger than double pica and smaller than double Columbian. By the point system it is known as twenty-eight points. Two lines and a half make an inch. Hansard estimates its size as thirty-two lines to a foot. The foreign names for it are in French, petit canon; in German, Roman; in Dutch, dubbelde Augustyn; in Italian, canoncino.

Double Extra Condensed.—A letter as thin as it is possible to make it, while still showing what it is meant for. It is the extreme of extra condensed.

Double Foolscap.—In England a size of printing-paper, 27 by 17 inches; writing-paper, 26½ by 16⅝ inches. In America it is only used concerning writing-paper, 17 by 28 inches.

Double Frame.—In England, a double stand with a double rack; in America, a frame upon which two pairs of cases can be put up at one time.

Double Great Primer.—A size of type larger than double Columbian and smaller than double paragon. It is four lines of bourgeois, and is about half an inch in depth. Two-line great primer is said by Hansard to be twenty-five and a half lines to a foot. Its foreign equivalents are in French, deux points de gros Romain; in German, Canon; in Dutch, kanon; and in Italian, Trismegisto.

Double Imperial.—A size of printing-paper in England, 44 by 30 inches; in America, 32 by 46 inches.

Double Imperial Cap.—In England a size of brown paper, 44 by 29 inches.

Double Large Cards.—In England a size of jobbing-card cut 6 by 4½ inches.

Double Large Post.—In England a size of writing-paper, 33 by 21 inches.

Double Letters.—Diphthongs and other types in which two or three characters are combined in one, such as æ and œ in Roman and old style, and ſk and ct in old style.

Double Medium.—A size of printing-paper, 24 by 38 inches. This is the size of paper most commonly made.

Double Narrow.—In England furniture six picas in width—double the width of a narrow.

Double Paragon.—A size of type which is four lines of long primer, being next larger than double great primer and smaller than canon. It is about five-eighths of an inch in depth, and on the point system is entitled forty points. It does not appear to have an exact equivalent in most foreign countries, in Italy the nearest body being called canone.

Double Pica.—A large size of printing-type, next larger than double small pica and next smaller than double English. By the point system it is twenty-four points. Three lines make an inch. According to Hansard it is in reality in England two lines of small pica. There it is forty-one and a half lines to the foot, which is exactly that of our double small pica. The foreign names for our double pica, which in Great Britain is called two-line pica, are in French, Palestine; in Dutch, dubbelde mediaan; and in Italian, Palestina.

Double Pica Reglet.—Wooden furniture of that depth in body.

Double Platen Machine.—A machine in England constructed upon the familiar Adams type, but, unlike that, having two platens and printing two sheets at each complete movement of the press.

Double Post.—A size of printing-paper in England, usually 32 by 20 inches.

Double Pot.—A size of printing-paper used in England, 25½ by 17 inches.

Double Rolling.—To pass the rollers over the form twice between an impression, or to do twice as much rolling as common.

Double Royal.—A size of printing-paper in England, 40 by 25 inches.

Double Rule.—A rule made with two lines on the face, both in brass and in type metal, the latter very rarely in this country.

Double Small Cards.—A size of jobbing-card in England cut 3½ by 5 inches.

Double Small Pica.—A large size of printing-type, next larger than paragon, and next smaller than double pica. About three and a third lines make an inch. On the point system this is known as twenty-two points. It is only used in jobs. Under this name it is not known in England, but it exists under the name of double pica. In French it is called gros parangon (great paragon); in German, Text or Secunda; in Dutch, dubbelde descendiaan; and in Italian, grosso parangone.

Double Small Post.—A size of writing-paper in England, 30½ by 19 inches.

Double Super-Royal.—In England a size of printing-paper, 41 by 27½ inches; in America, 28 by 42 and 29 by 43 inches.

Double Title.—When a book has two title-pages, one facing the other. They are on the second and third pages of the first signature. Their use is nearly entirely limited in England and America to books calculated for two languages, as a Dutch and English Bible, or a German and English grammar or dictionary. Another kind of double title is in collected works, as the Works of Voltaire. This would be on the first page, while on the third page there would be another title, the History of Charles XII. Engraved title-pages sometimes follow the same rule.

Doubled.—In tooling, where the instrument does not strike the second time exactly where it did at first.

Doubler (Fr.).—A repeated impression upon a sheet; a mackle.

Doublet.—A repetition by the compositor of a part of a word or of a word or words. It generally is occasioned by inattention. In England it is known as a double.

Doublon (Fr.).—A doublet.

Douze (Fr.).—Twelve. In-douze, in twelves or in duodecimo; in-douze oblong, a sheet of broad twelves.

Dove-Tail.—A form made up of pages which do not follow each other in consecutive order.

Dow, Moses A., publisher of the Waverley Magazine, of Boston, was born at Littleton, N. H., on May 25, 1810, and died on January 22, 1889, at Charlestown, Mass. He was apprenticed at the age of nineteen to the printer's trade, and with intervals as a publisher continued as a journeyman until 1850. In that year he borrowed $250, bought type and mortgaged it, obtaining with the money the other materials which he needed. Six female compositors were engaged, each to receive two dollars a week, and the remainder of their bills when the enterprise succeeded. Mr. Dow set much type himself, selected the copy and managed the business. After a few weeks it began to pay expenses, and in the end paid a profit of $150,000 yearly. He was a man of indefatigable industry, did the entire editorial work, read the manuscripts and attended to the mail.

Dow, Phineas, an inventor of printing-presses, was born in November, 1780, at Londonderry, N. H. He was apprenticed to a carpenter and afterwards to a coach-maker. During the war of 1812 he was employed as a wood-carver in Boston, when he lived next door to Daniel Treadwell, a silversmith, who subsequently became noted as a press-builder. After a time they joined forces and opened a machine-shop, the largest portion of their business coming from the repair of fire-engines and printing-presses. He invented a press known as the Dow press, which was in use for some time. About 1820 the firm brought out a power-press, which was the first ever used or made in America. When it was done no printer could be found to try it. Treadwell opened an office himself, but it was soon after burned down, and was supposed to have been set on fire by discontented pressmen. They were, at any rate, intensely hostile to the new contrivance. Other presses were made and sold, part to Ashmead of Philadelphia, and part to Fanshaw of New York. Among those who worked for Mr. Dow at this time were Isaac and Seth Adams, as well as Tufts, who afterwards became celebrated as a maker of presses. Mr. Dow's machine-shop was burned about 1830, and after that he removed to Philadelphia, where he continued a repair-shop until he was nearly ninety years of age.

Drafts.—The most useful size of paper for drafts is 17 by 22 inches. Sometimes 18 by 23 or 19 by 23 can be used to advantage, three to a page. The usual size is five to the folded page, or ten to the sheet.

Drag.—When a shake or slur is on a printed sheet it is said in England to drag.

Dragon.—Gum-dragon is a common name among binders for gum-tragacanth, which is much used by them.

Draw.—When through bad justification the letters are pulled out on the roller in inking the form they are said to draw.

Drawing-Foolscap.—In England, a thick, cream-wove paper of the best quality and color, very clean and intensely hard sized. The size is 16¾ by 13¼ inches. It is known in the trade as law foolscap.—*Southward.*

Drawing Lines.—Lifting lines from a page or form for a second printing in another color, the blank space being filled with their equivalent.

Drawing-Paper.—A paper, generally hand made, manufactured of the finest material and well sized. Very little is used by printers. In England paper of this kind is usually done up 472 sheets to a mill ream, with outsides; if all good sheets, that is, insides, 480.

Drawn Sheets.—This expression is used to indicate sheets drawn out from the heap in collating gathered books, when through carelessness two or three sheets have been placed together at a time instead of one. The sheets drawn may also be imperfect.

Dresser.—After type has been rubbed, to remove the inequalities on the side of the letters, it is set up in sticks and placed on long wooden frames, the nicks all one way. It is then passed to the type-dresser, who corrects inequalities on the front and back of the body and planes a groove in the centre of the base where the jet had been. The type is now perfectly square and level, and the face is examined with a magnifying glass. Every defective letter is discarded. Sometimes these do not amount to five letters in a hundred and sometimes they are more than twenty in a hundred. The dresser then arranges the proper proportion of each letter, according to the scheme of the house, upon small galleys, each holding a type-founder's page, which measures 6 by 4½ inches.

Dresser (Fr.).—To put up, to arrange; dresser une casse, to lay a case.

Dressing a Chase.—To make ready the furniture for a form. Not used in America.

Dressing-Block.—An obsolete term for the present planer. As described by the old writers it was also much smaller.

Dripping-Pan.—A tin tray under the ribs of a hand-press to catch the surplus oil.

Drive Out.—To space matter widely for the sake of having the preceding matter fill out a line, or for the general purpose of making the words cover more area.

Drive or **Strike.**—When the punch of a letter is completed it is necessary, in order to use it, to make an impression from it into a flat piece of copper, which, after being leveled and trued up, is used in the mold for casting from. This impression from the punch is generally made by a hammer. The punch is of hardened steel. It is held perpendicularly in the founder's left hand, face downward, while with a hammer in the other he strikes a smart blow upon its end. Much judgment is requisite, as the punch can only descend a certain distance, and if the true angle with the bar of copper is not kept much longer time will be required to make the lines of the letter coincident with and parallel to the surface. These impressions are known as drives or strikes. One is retained by the foundry for use, sometimes more, the punch being put away, while duplicates are frequently sold to other founders who may desire to use the same face.

Drop a Stickful.—To empty a stickful. An English expression.

Drop Letters.—Two-line letters, the top being as high as the top of a line of an advertisement or of reading matter, the remainder dropping down to the next line. This expression is not used in America, the equivalent being a two-line letter.

Dropped Head.—Chapter headings or those pages driven down at the top are thus called in England. In America it is said that the pages are sunk.

Dropping Out.—This term is used when, owing to long standing or the continuance of hot weather, the quoins of a form get loose and the pages drop out of the chase. Such an accident should very rarely happen. If the form has much wooden furniture and is to be kept a great while it should incline against a board which will touch the back everywhere, and the quoins should be tested with the fingers frequently, being tightened when that is needed. If the form cannot be inclined, or if there is no convenient place to keep it, it is better to put it up, unlock it, tie up the pages and clear away the furniture. All standing forms should be occasionally tested.

Druck (Ger.).—Impression.

Drucker (Ger.).—A pressman; a printer.

Druckerzimmer (Ger.).—The pressroom.

Druckfehler (Ger.).—Errors of the press.

Druckort (Ger.).—Place of publication.

Druckpapier (Ger.).—Printing-paper.

Drum Cylinder.—A well-known name for a cylinder press, on account of the resemblance to a drum of the part which gives an impression.

Drummond, Charles James, the secretary of the London Society of Compositors, was born at Ipswich, England, on July 30, 1848. In 1862 he was apprenticed to the proprietors of the Ipswich Journal, and in 1868 became a member of the Ipswich Typographical Society. He went to London at the expiration of his apprenticeship, securing work with the Messrs. Cassell. In 1872, being then in his twenty-fourth year, he was chosen by his chapel to represent them to the firm in obtaining a reduction of hours of labor from ten to nine. He was given notice to leave on this account, and was subsequently employed in a number of houses in that city, filling the position of father of the chapel in that of C. F. Roworth. In 1875 he was elected by the chapel to serve on the executive committee of the society, and a few months after was chosen to act as chairman of that committee. In 1878 he became assistant secretary, and in November, 1881, in consequence of the continued illness of Henry Self, the secretary, he was chosen to succeed him. This is the principal office in the society, and upon its careful and discreet management depends the success of typographical trades unionism in London. In this position he has acquitted himself well. The society now numbers 7,400 men. In 1884 he was appointed by the Home Secretary an honorary visitor of convict prisons, and has since been continued in that position. In 1885 he was appointed a member of the Royal Commission on Trade Depression. An active worker in trade charities, a new printers' pension was in 1889 named after him at the suggestion of Sir Algernon Borthwick. The preceding year he was made president of the Hearts of Oak Benefit Society, the largest organization of its kind in the United Kingdom. He has recently taken a very important part in raising the scale of prices for compositors in London.

CHARLES JAMES DRUMMOND.

Dry Color.—A finely-powdered pigment, applied by a brush, rag or cushion to a sheet which has been printed with varnish. The object in using dry colors is so that a sheen can be retained in the particles, which would be lost if they were thoroughly mixed with varnish, as ink is. This work is done in an air-tight room, and is very unhealthy.

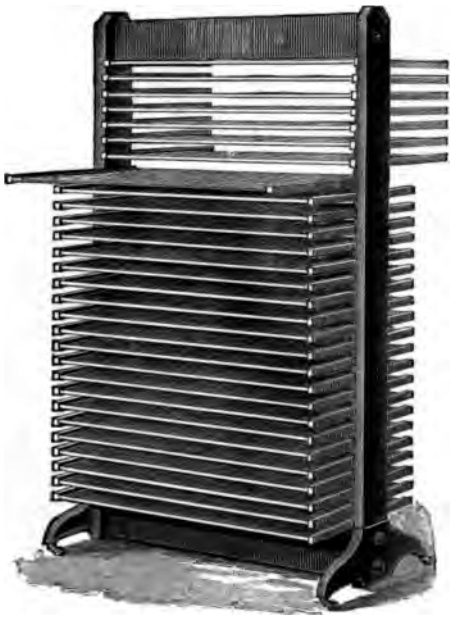
Dry Point.—A sharp needle which is used in copperplate engraving to draw fine lines and to make fine dots in stippling and shading.

Dry Pressing.—See STANDING PRESS.

Dryden Machine.—A perfecting printing-machine manufactured by a firm of that name in England.

Dryer.—A preparation used for increasing the drying properties of inks, depending chiefly upon the rapid oxidizing of the particles. See INK.

Drying.—Sheets after leaving the press need to be dried if the work is at all fine. The change of ink from a tenacious liquid to a fine, hard mark upon the surface of the paper is not accomplished at once. Formerly, too, paper was wet and needed several days, especially in damp weather, before it was fit to handle. It was placed, in half or quarter quires, upon the end of an instrument known as a peel, which was a long rod with a cross-piece at its termination, and by that laid upon poles which were found in the upper part of the warehouse, the composing-room and the bindery. Since the practice of wetting paper, except for newspapers, has ceased the necessity for drying poles and cords has also ended; but work printed with tenacious inks still requires some place to dry. The contrivances used in large establishments, where hot air or furnace heat is employed, will be described under the head of WAREHOUSE. The simpler and ordinary method is substantially that described by Moxon two hundred years ago, the sheets being still placed on poles in small heaps. The time which this requires is from a day to a week, although there are certain inks which do not seem to set for months. The outside films over, while the inside is soft and undesiccated. Ordinarily fair work is not hung up, but is sent out within one or two days. All ink-makers now manufacture inks of the qualities most called for and which dry very soon. It will sometimes happen that it is necessary to send out work as soon as it is done, although printed with ink which will not dry very soon, or upon hard glazed paper which will not absorb the color. In this case some printers cover it with powdered chalk or calcined magnesia. Either of these will dull the lustre of the ink somewhat, but the calcined magnesia is preferable in handling. They are applied with a pad or with a rag.



DRYING-RACK.

Drying-Rack.—A rack employed for laying printed sheets upon while they are drying. They are very compact and useful, and have two advantages over drying upon poles. The sheets are laid flat, and therefore have no curl or bend in them, and they are to a great extent protected from the dust which is floating through the atmosphere. In some cities these particles are so numerous that the clerks in business houses are obliged to tear off and throw away the top sheet of their writing-pads every morning, the pages being so charged with deposits from the air.

Dublin.—The capital of Ireland and for many years an important printing centre. From that city America has derived many noted printers, including among them Mathew Carey of Philadelphia.

Duck's Bill.—A tongue cut in a piece of stout paper or cardboard and pasted on the tympan at the bottom of the tympan sheet to support the paper while on the tympan.

Ductor.—A reservoir which holds the ink in a printing-machine, the supply from it being regulated so that the proper quantity may be given at each impression.

Ductor Keys.—Screws placed in the ductor to regulate the amount of ink to flow out for each impression.

Ductor Knife.—The long, thin plate which regulates the amount of ink used upon a press.

Due Punti (Ital.).—Colon.

Dumb Tooling.—Another name for blind or ungilt impressions with a tool or stamping instrument upon the sides or backs of books.

Dummy.—A few pages of a book or a portion of a job, newspaper or magazine put together in advance of the real publication in order to give those who see it an idea of how the work will look when done. It is printed upon paper of the exact size, and the type and manner of display is that which it is intended to use, although, if designed for the obtaining of subscriptions or advertisements, there may be more illustrations or favorable features than in the work at large. To issue dummies for canvassers is the universal practice.

Dunedin, New Zealand, is an important printing and publishing centre. It has a population of 46,000, with fourteen printing-offices. There are two dailies, four weeklies and five monthlies. Six of the printers are also lithographers.

Dunk's Chromatic Press.—A machine for printing in five or more colors at one time; patented by A. A. Dunk of Philadelphia. The paper was firmly held by the nippers until the whole of the printing was done, thus preventing slipping. One color was printed upon another while the latter was fresh, and, it is claimed, successfully.

Dunster, the Rev. Henry, the first president of Harvard College, was also the director for a number of years of the press which was set up at Cambridge, Mass., in 1638 and 1639. He married the widow of the Rev. Joss Glover, who obtained the money to put the press in operation and contributed largely to it himself. Dunster became president of Harvard College on August 27, 1640, resigned on October 24, 1654, and died on February 27, 1659.

Duodecimo or **12mo.**—A size of book next smaller than an octavo. It is much used for school-books, and is also greatly employed for all other kinds of work. The sheet, whether printed twelve or twenty-four pages at a time, consists of a main part and an inset, the main part being of eight pages and the inset of four. Usually speaking, the inset comprises the fifth, sixth, seventh and eighth pages, and is placed in the centre of the other sheet, between the fourth and ninth pages. Daily newspapers very often have insets in this way. But the offcut may also be the first, second, eleventh and twelfth pages, and it might be the third, fourth, ninth and tenth pages. There are methods of imposing twelves so that the sheet need not be cut, but convenience generally dictates the other way. There are two signatures to a 12mo sheet, the second being indicated by a star additional to the letter or figure used in the other place. A 12mo is a little nearer square in form than an octavo, the most usual size of the matter being 21 by 33 pica ems. Paper 20½ by 23 makes a leaf 5⅓ by 7⅔ inches; 19½ by 23 a leaf 4⅞ by 7⅔ inches, and 22 by 24 a leaf 5½ by 8 inches. Double-sized forms would be on paper 41 by 23, 39 by 23, and 44 by 24; but very much of this work is now done as sixteens and thirty-twos, the sizes then required being 41 by 31, 39 by 31, and 42 by 32. These sheets are more convenient to fold than the others, and they are more economical on presswork. Inside of a printing-office a duodecimo is always called a 12mo.

Duodez (Ger.).—Duodecimo, 12mo.

Dupe.—A contraction of the word duplicate, or the second proofs of matter which are given to newspaper compositors so that they can be pasted together and measured. This word has come up in American cities within the last thirty years, the word formerly employed and which still is to some extent used being slips. Up to about 1845 daily newspapers in New York, Philadelphia and elsewhere were measured upon the paper after it was printed. The first compositor who arrived in the morning took the paper, and with a crayon or lead-pencil went carefully over the whole of it, marking what he had set and putting a line across the column at its foot and head. The next compositor did the same, and so on until the whole of them had marked what they had done. A great variety of marks was necessary, if there were many compositors and if many devices were employed. A perpendicular line the whole length, lines inclined at an angle of forty-five degrees, serpentine marks, checker-board patterns and others in lead-pencil and blue, red and green crayons were all used. At completion a newspaper looked like a gorgeous piece of patchwork. When the matter was measured, one man after another was called up to indicate what he had set, which took much of the compositor's time. The measurer was employed on small papers, with few hands, for nearly a whole day in preparing the accounts for a week, while on large journals, with small takes, he might be and frequently was engaged in this labor for the whole of his time. Much dissatisfaction prevailed among the compositors in consequence of the imperfection of this system. Their takes were frequently lost, the marks were often ambiguous, and disputes sometimes arose between two men as to which had set a certain paragraph. Memory was often treacherous. Some men had a practice of marking after the rest had done and putting their device upon all the takes which remained unmarked, as a certain proportion was forgotten; this increased their bills, but decreased those of the men who had marked earlier. These considerations induced Thomas N. Rooker, about 1845, to invent a system of numbered slugs, by which the matter was supported upon the galley, and by which it could at once be told who had set a given take. This proof was taken in duplicate, and one of them was given to the compositor. As the system was perfected the second proof was printed upon tinted or colored paper, and a steel roller, having a width of from half an inch to an inch and with an arabesque or geometrical design upon its face in intaglio, was inked and passed over its whole length. This was the office mark or guaranty that the proof was really to be measured. Instances have been known where proofs were taken from matter set several days before, or where two compositors measured the same take upon the same day. The second proof upon the colored paper is taken when the matter is first set, the office mark being placed upon it the next day by the measurer, who is usually a weekly hand of experience and with a good knowledge of arithmetic. The roller is kept carefully locked up at other times. After all of the proofs are marked he takes them to his desk, and with a pair of shears cuts each proof up into as many pieces as there are takes. The takes of each man are then put into an envelope and left upon his case. When the time of measuring draws near the compositor pastes together his duplicates, agate upon agate, nonpareil upon nonpareil, minion upon minion and brevier upon brevier, and hands them to the measurer, who goes over them with a string, made preferably of a piece of fish-line. There is a knot at one end, which indicates where the measuring begins. The measuring-gauge is usually upon a sheet of paper in a frame and preserved against fingers and dust by a glass over it, but sometimes it is a metallic or wooden gauge. After being measured the amount is entered and a brush, charged with lampblack, is passed over the proofs to make certain that they cannot again be measured. The name of the compositor is written upon the head of the slips, with the date, and the proof is then rolled up and put away, being preserved for a month to three months. Compositors who are without money in the middle of a week frequently endeavor to sell their duplicates or slips. This is very rightly frowned upon by well-conducted establishments, as it tends to make men improvident and gives to the stockholders of the newspapers very erroneous ideas of the earnings of the workmen. In some book offices a system somewhat like that of newspapers in regard to measuring proofs is now observed, but it is not generally done, as there are many difficulties.

Duplex Cards.—A term in England for cards which have different colored surfaces on the two sides.

Duplex Paper.—Paper with the sides of different colors, made by coloring each side separately.

Duplieren (Ger.).—A double impression; a mackle.

Durchschiessen (Ger.).—To lead or to space.

Durchschossen (Ger.).—Interleaved.

Durchschuss (Ger.).—Leads.

Durchsehen (Ger.).—To revise.

Dürer, Albrecht, the originator of the art of wood-engraving, considered from the point of view of an artist, was born at Nuremberg, in Germany, on May 20, 1471, and died there on April 6, 1528. He was the son of a skillful goldsmith, and received a good education. He became proficient in his father's art, but gave it up and studied painting under Martin Schön and Michael Wohlgemuth. In 1490 he began traveling through Germany, painting portraits and other pictures, which were much admired, and returning home in 1493. Soon after he exhibited a drawing of Orpheus, which was so good that he was received among the painters as a master. He again began traveling, visiting Holland and Italy, where he executed some of his best paintings, such as Adam and Eve and the Martyrdom of St. Bartholomew. In Bologna he became acquainted with Raphael, who highly esteemed him. He returned home in 1507 with the reputation of being the best German painter of the day. He dwelt in Nuremberg for the remainder of his life, which is said to have been shortened by domestic misfortunes. His first series of wood-cuts, illustrating Revelations, appeared in 1498. From that time he continued engraving, alternating it with painting, for the remainder of his life. The best of his wood-cuts, in respect both to invention and execution, are generally esteemed to be his greater Passion and his Revelation of St. John. So much were they sought after, even during his lifetime, that a Venetian artist, named Marc Antonio Franci, was induced to counterfeit them. When Dürer heard of this forgery he went to Venice and began a suit against the man. The Senate of Venice would have punished him severely if Dürer had not obtained his pardon. He depended upon line for the method of his work, and its execution was simple and excellent. Cross-hatching was not invented by him, as has sometimes been asserted, but he used it more freely than his predecessors and contemporaries, and made it more valuable. His perspective and anatomy were very good. He is one of those to whom the discovery of the art of etching has been ascribed, and in its practice he was very successful. He was also an excellent copperplate engraver. He wrote several valuable works on geometry, perspective and fortification, writing his native language with much purity. When the Reformation came, and Luther began battling against the priests, Dürer sided with him and did much to advance its cause. In private life he was amiable, upright and benevolent. The Senate of Nuremberg decreed him a public funeral, which was celebrated with great pomp and solemnity. The portrait given herewith is copied from one made by himself.

ALBRECHT DÜRER.

Du Seuil, Augustin, a French binder who learned his trade with Boyer, but professed a more ornate style. He indulged in broad dentelle borders and preferred olive morocco for the production of his best effects. He was connected by marriage with the Padeloups.

Dutch.—The language spoken in Holland. It is a branch of the Low German family and has two cognate dialects, known as Frisic and Flemish. The former has very little written literature, and this is mostly archaic; but Flemish, spoken in Belgium, is now to some extent cultivated, it having at present several novel writers of repute. Dutch is the most closely allied to English of any language now spoken; its grammar is comparatively simple and its orthography is uniform. Its literature extends through all branches and is also very large, but activity in this line is now chiefly confined to newspapers, translations, novels, theology and compilations. It can easily be understood by those who have a competent acquaintance with both English and German. Printing is done nearly entirely in the Roman character, books in black-letter being almost exclusively ecclesiastical. The Roman face bears a close resemblance to the English and differs from that used elsewhere in Europe. This is probably occasioned by the fact that early English printers found it necessary to buy their types in Holland if they wished good faces, a custom which continued till Caslon, the first great British type-founder, produced styles preferable to the Dutch, although still bearing much resemblance. There are no Dutch works on practical typography of the present day, their manuals being French and German, and there is no distinctive school of taste in printing, although their work is good. The principal place in which printing is carried on is Amsterdam. Dutch is divided at the end of lines on about the same rules as German. The peculiar accents are ÿ and ẅ.

THE DÜRER ARMS.

The spelling of to-day differs from that of a hundred years ago, the government at about the beginning of the century charging a commission with the revision of the rules of orthography. This, by the authority of the learned literary men and of the government, was generally accepted. These changes, which were as great as those which Professor Marsh and Professor Lounsbury desire to adopt in English, are the only ones which have been made at once in any language with a considerable literature. The variations between the English of the present day and of two hundred years ago have been made very slowly, and no one could then have predicted which words would be altered. The same may be said of French and Italian. The upright stroke (/) is still used in lieu of a comma in black-letter books in Holland. There can be no question that there would have been a richer literature in that country if Latin had not been so extensively used for the works of the learned. As it is, Dutch may be esteemed as surpassing in all branches, except original literature, all of the languages of Europe, save French, English, German, Italian and Spanish, not being far from an equality with the latter two. In original literature it did much in the seventeenth and eighteenth centuries.

Dutchman.—A jocose name for a plug of wood, sharpened at one end, and driven into a weak place in a form. The use of such a contrivance is regarded as very discreditable.

Dutch Gold.—The name in commerce for copper, brass and bronze leaf, used in Holland for ornamenting paper and toys. It is usually an alloy of eleven parts of copper and two of zinc rolled into thin sheets.

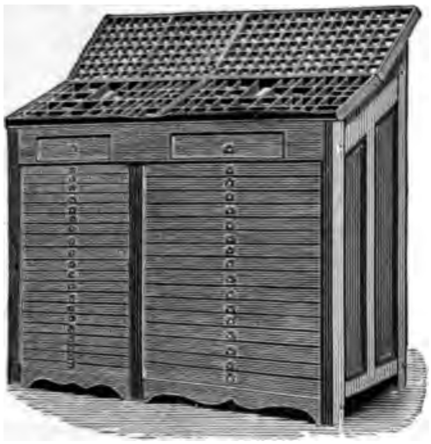
Dutch Paper.—This is a purely hand-made paper, rough on the surface and ragged at the edges, otherwise known as deckle-edged. It is chiefly made at Maestricht, Amsterdam and Apeldoorn. This paper is much more difficult to print on than our common paper, as from the fact that the edges are irregular it is hard to produce an exact register, and the rough surface necessitates slow presswork and new type. It can be obtained in tints. It is worth from thirty to sixty cents a pound in this market, and the sizes are always small.

Dwell.—The time during which the impression upon a form remains at its maximum, if long, is known as a dwell.

E

E THE fifth letter in English. It is nearly as thick as an en quadrat. It occurs more frequently than any other letter, four letters being used where three t's are required. Three times as many e's are used as d's, and nearly a hundred times as many as z's. The box is consequently the largest in the lower case. The capital letter has no resemblance to the small one, but bears much similarity to F, one of the bars being, however, missing in the latter. E, as an abbreviation, stands in English for east. On ancient medals it stands for the name of cities which begin with this letter, and for exercitus, effigies, edictum.

Eagle Cabinet.—A kind of cabinet for holding cases of type. There are no projections on the lower bar of the case, so that it can be closed securely against dust.



EAGLE CABINET.

Ear.—That part of a composing-rule which projects beyond the rest, and by which it is pulled out from between lines.

Ear of the Frisket.—A thumb-piece used in turning down the frisket on the tympan.

Early Impression.—In prints, among the first impressions made from an engraving. It is more valuable than a late impression, because the plate is less worn.

Eastburn, John H., of Boston, was born in that city in 1805, and in early life was apprenticed to the printing business. At the age of twenty-one he opened a job office, and in 1827 was appointed city printer, holding that position for twenty-seven years. In 1832 he began the publication of the Boston Daily Atlas, and he was also the publisher of various weeklies and monthlies. He established a bed at the Massachusetts General Hospital for sick printers, to be called the Printer's Bed. It was his wish that this bed should be used by any poor printer who might be suffering from sickness or bodily injury. The Franklin Typographical Society received by his will $5,000, together with some pictures and articles of use and adornment, and nearly all the remainder of his estate was given to those who had been employed by him as journeymen. He died on July 1, 1873.

Easy Pull.—A soft or easy pull is when the bar of a press requires comparatively little power to make an impression.

Eau-forte (Fr.).—An etching.

Eau-fortier (Fr.).—An etcher.

Écaillé (Fr.).—Veau écaillé, calf binding rubbed.

Échantillon (Fr.).—Specimen; échantillon des caractères, a specimen of printing-types.

Echar al Pastel (Sp.).—To throw into the hell-box.

Echar en Prensa or **Echar Forma** (Sp.).—To send to press.

Echar Fundición (Sp.).—To lay new type.

Eckerson Press.—A web press manufactured at Oneonta, N. Y., having a flat bed and platen. The sizes of sheet printed are from eighth medium to medium, and the machine is either perfecting or non-perfecting. The roll is at one end of the press, near the bottom, and is fed without an attendant. After being printed the paper is automatically cut off. Another device cuts the paper lengthwise, so that any size or shape of job up to the maximum capacity of the press can be printed. It is said that it will give five thousand impressions an hour.

Eclectic.—Selected. A term applied to magazines which are selected and reprinted from foreign magazines.

Écrivain (Fr.).—A writer.

Écrou (Fr.).—A nut (to a screw).

Ectypography.—A method of so-called etching by which the lines are produced in relief instead of being depressed or cut in.

Edes, Benjamin, a printer of Boston who for many years published with John Gill a newspaper called the Boston Gazette, taking the popular side in the controversy with Great Britain. He was born in Charlestown, Mass., on October 14, 1732. After the war broke out he printed his newspaper at Watertown, but when the British evacuated Boston he returned. Other newspapers were begun which lessened the value of his; paper currency destroyed the evidences of debt which had been contracted for in gold, and he died in poverty on December 11, 1803.

Edge-Rolled.—In binding, when the edges of the boards are rolled, either in blind or in gold.

Edges Trimmed.—A book or pamphlet with the edges partly cut to make them tidy, but not sufficiently to open the leaves.—*Caspar.*

Edges Untouched.—A book or pamphlet with the edges uncut or unopened.

Edidit (Lat.).—(He) edited; published by. Used on title-pages of Latin books.

Edinburgh, the capital of Scotland, has now for many years been one of the centres of bookmaking in the English language. During the reign of James IV. Walter Chepman or Chapman, a rich tradesman and a man of influence, obtained for himself and Androw Myllar a patent for printing in Scotland, still extant. Myllar had learned the art of printing at Rouen at the close of the fifteenth century. Their work began in 1508 in Edinburgh. The remains are scanty, but enough is known to determine that French type was used. One work brought out was a breviary for the Bishop of Aberdeen. It is in two volumes. In 1541 several acts of Parliament were printed by Thomas Davidson, the king's printer. Another printer a little later was Robert Lekprivik, who had presses at Edinburgh, St. Andrew's and Stirling. Thomas Bassendyne printed a folio Bible in 1576, Alexander Arbuthnet issued Buchanan's History in Latin in 1582, and a folio Bible was put out by Andrew Hart in 1610. These printers were as good as any in the three kingdoms at that time. Others continued the occupation until the time of Charles II., when the calling received an almost fatal blow. Alexander Anderson, formerly a printer at Glasgow, but then in Edinburgh, prevailed on the other printers in the city to apply for a patent to be taken out in the name of Anderson, by which they were to be jointly vested with the office of king's printer. They succeeded in their application, and obtained so broad a patent that no one in Scotland dared print anything, from a ballad to a Bible, without a license from Anderson. After a little the partners disagreed and sold their rights to Mrs. Anderson, Anderson being dead. A New Testament printed by Anderson in his first year was so full of errors that the Privy Council prohibited the sale of the incorrect copies and ordered that future editions of the Scriptures should undergo an accurate revision. Notwithstanding this injunction, says a contemporary, "nothing came from the royal press but the most illegible and incorrect Bibles and books that ever were printed in any place in the world. She [Mrs. Anderson] regarded not the honor of the nation, and never minded the duty laid upon her as the sovereign's servant. 'Prentices, instead of the best workmen, were generally employed in printing the sacred word of God." She enforced her patent against all other printers, but complaint was made to the Duke of York and the matter was carried before the Privy Council, when her privileges were curtailed. She continued her attacks on the other printers till 1695, when she finally found them to be in vain. In that year James Watson, who afterwards wrote a History of the Art of Printing, began business for himself. Up to 1740 business was carried on in Edinburgh on a very limited scale. A great cause of its subsequent rapid extension was the ease with which Scotch printers, without violating the law, could reprint English works. It is noteworthy that Smellie, the philosopher, a reader in Edinburgh in 1763, was the first who thought out a detailed scale of prices for journeymen on piece-work. In Scotland at this time brevier type was twopence halfpenny per thousand ens, or ten cents a thousand ems. The leading industries of Edinburgh now are printing and brewing. In 1763 there were only four printing-houses in Edinburgh; in 1790, twenty-one; in 1800, thirty; and in 1805, forty, with one hundred and twenty printing-presses. In 1888 there were considerably over one hundred printing-houses, and any of the largest of these produced much more printing matter than the whole of the one hundred and twenty presses employed did in 1805. The number of persons at present employed, including compositors, pressmen and folding-girls, is about three thousand, three hundred of these being female compositors. Much type is required. A few years ago publishers were content if a printer could set up three sheets of a book at once; one out in proof and the other two in hand. The next could be set as soon as the first was printed off and the type was distributed. They are now required to put large volumes in type at once, and even to keep them standing for months, until it is seen whether a second edition will be required. The work executed is of a high standard; in maps it is unequaled anywhere that English is spoken. During the last quarter of the last century, when Hume and Robertson dwelt there, it was a place of great literary activity, and this extended down into the present century, when the Edinburgh Review was the first critical journal in the language and Blackwood's the best collection of light literature. But although the facilities for the manufacture of books have increased the authors have drifted away, and Edinburgh is like all other towns in the British empire, except London, without much literary productiveness by resident writers. Most publishing-houses still nominally of Edinburgh have branches at London which are frequently larger than the parent establishments. Wages in Edinburgh for journeymen are from thirty to thirty-five shillings a week, the hours of labor being fifty-four. Many women are employed as compositors, feeders and folders. They generally go to work when very young, rising as they become more useful till their wages reach fourteen to sixteen shillings. Very good female compositors sometimes get a pound a week.

Éditeur (Fr.).—Publisher. This is frequently mistranslated into English as editor. That word is rédacteur in French. Another word with which frequent errors are made is libraire, which signifies bookseller and not librarian. The latter is bibliothécaire.

Edition.—The number of copies of a book, pamphlet, newspaper or job printed at one time. A long edition is when many impressions are taken; a short edition is when only a few are required. Before the introduction of stereotyping the word edition was more definite than it is now, as the type was generally distributed between each issue, and it was possible for the author or editor to supply omissions, correct errors and improve the appearance. As the type must again be set up, it cost the publisher no more to allow changes to be made than it would if the pages were unaltered. With the introduction of stereotyping this facility of alteration ceased, and a second or third edition was very much like the first. At the present day publishers dislike very much to make alterations in plates, and pressmen dislike to print those in which such changes have been made. The substituted types are either light or heavy and spoil the appearance of the page, and the make-ready requires more care. It is understood that our most successful publishers, those with the most capital and the widest connection, regard ten thousand as an edition for a popular novel, and five thousand as an edition for other popular books; but other publishers regard two thousand and one thousand enough for most works. In school-books, on the other hand, an edition may be fifty or one hundred thousand. Printers must be governed very much in making their charges by the length of the edition. Each new form requires a fresh make-ready, varying from an hour on the simplest work to three and four days on illustrated books. If a job which goes on the press stays there a month and takes a day to make ready, the time thus lost is not very important; but if a day is required for the same reason where only one or two thousand copies are to be printed the charges must be enough to meet all waste of time. On daily papers, and particularly afternoon dailies, it is usual to print several editions that those who desire news early may be able to get it without waiting until the last edition. It is customary in those cases to change only a portion of the matter in one or two pages. The publisher of a newspaper also uses the word edition as implying all of the copies he has sent out, independent of the fact that he published a first, second or third edition.

Édition de Luxe.—A French expression for books printed in comparatively small editions with excellent paper, new type and large margins. It is considerably used in English.

Edition Work.—In bookbinding, that kind of work which is done in great numbers, as a cloth-bound book for the booksellers. The method of working is entirely different from that in a bindery where jobs are done.

Editio Princeps (Lat.).—The first or original edition of a book.

Editor.—1. The chief writer of a newspaper, or he who is responsible for its policy or management. Until about the beginning of the present century the editor was known in the United States as the printer, although he might have no knowledge of the art. Thus Webster, the lexicographer, when the editor of a daily newspaper in New York in 1795, was entered in the directory as "Noah Webster, printer." This usage lasted until about 1830, and occasionally as late as 1845. On small newspapers the editor does much writing, but on the larger his time is chiefly taken up with questions of policy, in meeting visitors who have matters which they desire to impress upon him, in revision and examination of the work of his assistants, and in correspondence. In the largest newspapers much of the correspondence is done by his private secretary. In this grade of journals he has no routine duties to perform. The choice of what shall be put into the next paper is determined by his chief assistant, the managing editor, who sees and knows everything about the details which is possible. In England the leader writers are not responsible to the sub-editor, the English equivalent for managing editor, but they are nearly always under his control in America. The managing editor employs and discharges the other writers, determines their compensation, prepares the newspaper and is accountable for everything. In some newspapers the editorial articles are determined by a council held every day, at which each writer present has a subject assigned to him for the morning's issue, but this is infrequent. Next to the managing editor the one who has the most responsibility is the city editor, under whom are all the reporters, and who gathers all of the local news. Other editors are the leader writers, the night editor and assistant night editor, the telegraph editor, the sporting editor, the financial editor and the exchange reader. 2. The person who revises or prepares a work for publication. This is the older sense in English. Many works, such as encyclopædias, are issued in collaboration. It is therefore necessary, no matter how eminent the writers may be, to determine upon the scope of the articles, their length, illustrations and form, and to test their accuracy. The person who performs this duty is the editor. An editor may also revise, add to or take away from an old book.

Editorial.—Those articles in a newspaper which express the views of the editor. They are usually together on a page known as the editorial page, and are in larger type than the rest of the journal, generally being leaded. On large dailies they are generally written by men who do little else. Frequently outsiders contribute regularly on subjects of which men generally know little, as, for instance, theology, law, medicine or naval affairs. Until about 1840 American newspapers rarely published more than a column of editorials, and twenty years before the practice of giving expression to opinions in this way was not common. One New York daily of the present day, the editor of which is a writer of undoubted ability and force, sometimes has no editorials. The news given comments upon itself. In England editorials became common during the Napoleonic wars, and now usually fill a full page of a London daily, each article being a little over a column in length.

Egipcias (Sp.).—Egyptian (corresponds to the American Doric).

Eidograph.—An instrument for copying drawings on the same or a different scale; a form of the pantograph.

Eidography.—A process discovered by Eckardt in Munich by which drawings, &c., can be etched on metal plates for process printing, and can also be transformed into relief plates for letter-press printing by means of electrical action.

Eighteenmo or **Eighteens.**—A sheet folded into eighteen leaves, or thirty-six pages. The term is generally written 18mo, but sometimes at length, octodecimo. It is a difficult form to impose.

Eights.—A familiar term used by compositors for an octavo sheet or imposition.

Einband (Ger.).—Binding; the idea which it is intended to convey by this word is a solid back, fitted, cut and ready for use. If the back and cover are only protected by paper they are said to be pappband, *i. e.*, paper-boards.

Einbanddeckel (Ger.).—Binding cover; the covering or binding furnished by publishing-houses for binding periodicals or works issued unbound in parts.

Einbringen (Ger.).—To get in, as more words in a line.

Einfassung (Ger.).—The border.

Eingehen (Ger.).—Literally, to go in—in American parlance, "to go up;" ceasing to exist—said of firms, newspapers, &c.; eingegangen, extinct.

Einheben (Ger.).—To put the form to press.

Einkeilen (Ger.).—To drive in the quoins.

Einlaufen (Ger.).—Shrinking.

Einlegedeckel (Ger.).—The inner tympan.

Einlegen (Ger.).—To lay in (type).

Einleitung (Ger.).—The introduction.

Einschaltung (Ger.).—An intercalation.

Einstechen (Ger.).—To point upon a press.

Einstechbogen (Ger.).—The tympan sheet.

Ejemplar (Sp.).—A complete copy of a book or job.

Election Tickets are printed on almost all kinds of white paper, but 24 by 38 is the usual size. Since the passage of the Australian ballot law by many of the States it has become necessary in some of them to number the ballots, which has required much shifting and moving of forms by those who were not provided with numbering-machines. It is supposed that, on account of party divisions and the waste which occurs, a hundred tickets in all are required for each voter who appears at the polls in any one of our principal cities.

Electric Light.—See LIGHT.

Electrical Power.—Within the last few years electricity has been largely used as power in printing-houses. Offices of the first magnitude are not at present employing it, as such a vast variety of machinery must be kept going that a steam-engine is required; but where there are from two to six presses electric power is both economical and convenient. There is no dust, no space required for coal, no licensed engineer to be employed, and very little room is needed for the dynamo. The power, too, is always ready during working hours.

The electricity, being generated in some central place, is transmitted to the office where it is to be used. Here the force must be made rotary. The direct attraction and repulsion of electro-magnets on their armatures were all that could be relied upon a few years ago, yet this power was very slight, and the parts which were to repel and attract had to be placed very near together. By the modern dynamo immensely increased power is secured. This consists of a rotating armature carrying coils of insulated wire. These coils move in the field of a strong electro-magnet, arranged so that the whole or a portion of the current can be passed through the magnet coils. When the current becomes stronger the magnet therefore becomes stronger, and a very powerful action is thereby excited. By this method very little of the electricity is lost.

The discoveries which contribute to the efficiency of the modern dynamo were made at great intervals. Faraday succeeded in causing a rotary motion in the year 1821, and so many successive improvements followed that in 1839 Jacobi was able to propel a boat on the River Neva. Up to 1873, however, the methods had not been such that they could be used commercially, as the cost was too great. At about this time Wheatstone and Siemens succeeded in the problem of showing how electricity, developed in a certain place, could be turned into power at another point substantially without loss. The setting forth of this fact to the world was at the Vienna Exposition, through the agency of Hippolyte Fontaine, who had discovered that if two dynamo-electric machines were coupled in an electric circuit, the armature of one revolving by suitable power, the armature of the second would, apparently of its own accord, also revolve. If geared with a machine work could be done on the latter. The power expended on the first machine is electrically transmitted to the other.

THE EDDY DYNAMO.

Motors varying from one-tenth of a horse-power to one hundred and fifty horse-power are manufactured by a number of firms. Electrical energy is transmitted to them from a general station, the charges usually being about one hundred dollars a horse-power a year. They are much simpler to handle than steam-engines, and all the knowledge necessary to direct them can be easily acquired. The system of conductors is far more flexible than that by any other system, as it can round the most abrupt corners, and the space required is very small.

Electricity is now an important subject in relation to a printing-office; machinery is driven by it and light is obtained; signals are given and bells are sounded by its means; elevators are propelled, and it is a disturbing force in the pressroom. The method of making plates by its use, known as electrotyping, is of great value to the art. Under various forms manifestations of electricity were known to the ancients, but it was not until about the year 1600 that systematic experiments were made to discover its qualities. A great number of persons attempted to analyze it and to find how it could be brought forth, how it was confined and how transmitted, and what action it would have upon other substances in nature.

The chief early discoveries were those of electrical conduction and the classification of bodies into conductors and non-conductors; the negative and positive conditions, the Leyden jar, the identity of lightning with electricity, and the voltaic pile, by which electricity could be generated. Later many new qualities and powers were discovered. The telegraph depends upon frequent movements and cessations of a current of electricity; the telephone upon its reproduction by vibration at the end of a wire of the various sounds of the human voice, and the phonograph by indenting upon a plate the vibrations which arrive in such a manner that when rotated, in conjunction with the proper devices, the indented plate will cause the vibrations to begin again so distinctly that they can be heard. The first of these three has had a wonderful influence upon the press, annihilating distance, and it may be expected that the last two will also make great changes in this relation. Each of the principal forms in which electricity is used or as it modifies printing is shown under its respective head.

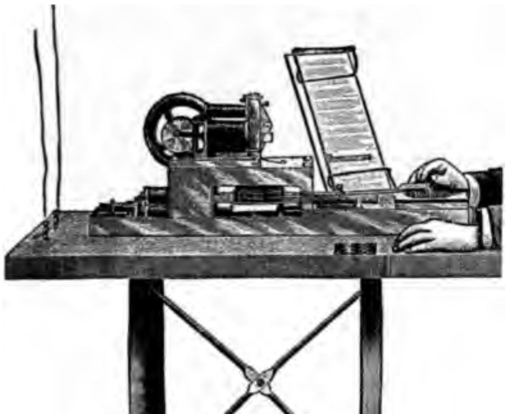
Electricity in Paper.—Since the custom of dry-printing has come into vogue printers have been much troubled with electricity in paper. This is very much more apparent in the winter than in the summer, the weather then being dry and cold. All of the phenomena of attraction and repulsion are shown in cold weather; but on particular days, with particular presses, or with certain makes of paper, much more than on others. The electricity is generated during the process of manufacture, and remains stored in the bundle of paper until it is gradually dissipated or drawn off by natural causes. Exposed in small quantities where conductors are present it is lost more quickly than when massed; but it remains in the packages more or less for six months or a year. All direct attempts to take away electricity by placing conducting wires against the bed or cylinder of the press or its delivery-board have been attended with only very moderate success; on some days the electricity is drawn away more freely than on others, but no certain dependence can be placed upon such remedies. The sheets are electrical when taken up by the feeder, but the passage through the press excites them, and when the sheet is to be deposited the attraction or repulsion, or both, which it has for the pile already deposited causes it to fall unequally, thereby slipping from its true place and rubbing its under side against the fresh ink upon the sheet which is on the top of the pile. An offset results, while the sheet which is under is smutted. The electricity also causes the paper to resist the jogger.

The efforts of pressmen to avoid this difficulty have as yet been productive of no good results, nor have the patent processes worked well for any length of time. Wires are still used as an alleviative, but the most effective remedy yet known is to keep the room moist. In the winter the air is nearly always dry, but in summer it has much moisture. In the latter season electricity manifests itself very slightly; but in the former largely. In one of the largest pressrooms in the United States steam is allowed to escape in considerable quantities into the room, which is consequently always damp, although warm, workmen being liable to attacks of colds and rheumatism. In other places pans of water and huge sponges saturated with water are placed beneath and above the presses. In still other places jets of water are used like those in an atomizer. An acute observer recommends that, in addition to wet cloths and sponges, sprays and the escape of steam into the room, a current of warm, moist air shall be sent past the presses by a blower, which should be placed in the boiler-room, and when set in motion a small jet of steam should be allowed to escape into it. Tin pipes can lead the air to the places in the pressroom where it is most needed.

The paper manufacturers of the United States should realize the importance of this matter and adopt methods to dissipate electricity from paper at the mills. To do so is possible. Some printers place their orders subject to a guarantee from the manufacturers that the goods shall be free from electricity.

Electro-Etching.—A mode of etching upon metal by electro-chemical decomposition. If two plates of copper are connected with the opposite ends of a voltaic battery and placed in a vessel containing water mixed with a little sulphuric acid, the plate connected with the positive end will be attacked by the oxygen which is released during the decomposition of the water. This destructive action can be localized at pleasure by covering certain parts of the plate with a protecting stratum of varnish. Upon and through this varnish a drawing can be made which will leave its lines free for the oxygen to act upon. The lines which are fine can be stopped out in the same manner as in other etching.

Electro-Matrix Machine.—A die-assembling machine designed to produce matrixes suitable for a printing-office; first brought out in 1888 at Minneapolis, Minn. As shown, it was a very compact and pretty machine. In the centre was a die plate about three inches in diameter, which carried ninety-one dies, comprising all of the characters required to be used in the body of any printed article. This die plant stood on short legs and slid on a steel plate about six inches square, having a small hole in its centre through which the dies were driven to the matrix below. The die plate was attached to a thin lever about seven inches long, on the outer end of which was a hard rubber button about the size and shape of the button on a telephonic instrument. The lever was pivoted about the middle of its length upon a slide moving in and out from the centre of the machine. By means of this swinging and sliding motion a person taking hold of the button at the outer end could throw any part of the die plate over the hole in the steel plate below. At the outer end of the lever, just below the button, was a metallic point which slid over a hard rubber plate with holes arranged to correspond exactly with the arrangement of the dies in the die plate. By bringing over the button and pressing it down into one of these holes the corresponding die was brought directly over the hole in the steel plate. When it was pressed down it made an electrical connection which, by means of magnets at the back, threw the matrix the proper distance for the letter to be printed and at the same time forced a hammer down upon the die, driving it through the hole in the plate. When a space was needed the matrix was moved along the proper distance without having any impression made. The end of the line being reached, a touch upon one key returned the matrix to the position proper for beginning another line.


ELECTRO-MATRIX MACHINE.

The whole machine was considerably smaller than a typewriter, and like it was mounted upon a table. The matrix was of thick paper, just the width of the column desired. When shown this machine was imperfect in two respects. It was a newspaper machine, and the matrixes, after being set, were to be divided by shears and placed in their proper positions in a form, so that casting could be done upon them. This form would be concave; but no contrivance was shown by which the little pieces of thick paper or cardboard could be secured against displacement, or by which they could be prevented from floating. Another lack was some system of justification. The plan proposed was to have the copy written on a typewriter, to each letter of which there was a numbering attachment. As the line was written the thickness of the letters was registered, and when near the limit the line was stopped. Each letter had a thickness assigned to it in the calculation, on the same system as that in Benton's self-spacing type, as, for instance:

When in the course of human events it be-
7 535 25 253 445333 42 55645 343523 22 532

In this case the line has 124 units and eight spaces, while the total length of the line should be 150 units. By subtracting the 124 from the 150 units twenty-six are left, which must be placed among the eight spaces. Six three-unit spaces and two four-unit spaces will exactly accomplish this; but unfortunately copy is not generally written on a typewriter, and even if it should be the machine has generally no numbering attachment, and a new and great cost was added. Work has again begun on this machine, after being stopped for a year or two. Capeheart, the inventor, met with a serious accident shortly after the contrivance was shown, and was not able to go on with it for a long time.

Electrotyping.—The art of taking one metal, and, after placing it in a state of solution, causing it by electric or galvanic action to spread itself over the surface of a mold of whatever design, and there be deposited in a film or sheet. It is used in nearly all branches of human industry, but as here employed is spoken of only in reference to printing, in which it has proved of incalculable value. Small particles of metal penetrate the most remote recesses, and the finest lines are reproduced by it with accuracy and delicacy. It has almost entirely superseded stereotyping, as wood-cuts can be much better copied by it than by the older process. In brief the process is, after the page or cut is made ready and perfectly clean, to impress it with great power into a sheet of wax; then this sheet, after having had its surface equally and thinly covered with powdered plumbago, is suspended in a galvanic bath in which copper is present in a state of solution; the copper being affected by electricity leaves the solution and deposits itself evenly over the face of the mold; the film or sheet is removed when it is thought to be thick enough, and is covered on the back with tin or a compound into which tin enters, which serves as a solder to which electrotype metal, or a compound closely resembling type metal, will adhere. Enough of the latter is added to make a thoroughly sound, stiff plate from one-tenth to one-sixth of an inch in thickness, and it is then planed, trimmed, beveled or has other operations performed upon it to increase its evenness or the ease with which it can be used. All of the processes are mechanical up to the time that the mold is inserted in the bath, and all which follow its leaving are also mechanical. The deposition of the shell is the only electrical process.

The first process in electrotyping is locking up the pages properly. This is nearly always done in small chases, containing two octavo or three duodecimo pages, as the forms are more convenient to handle, and it is also easier to obtain a proper impression from them in wax. The largest size of chases generally employed for book pages is a little over 10 by 13 inches, although they can be had of twice this size. As usually made the smaller sizes are of cast iron, although wrought iron is better. Have one of the corners square, with adjacent sides true. The other corners are slightly rounded, making the chase stronger than with square ones. The preferable height is three-quarters of an inch. Against the outside of the pages are placed guards or slugs one-fourth of an inch in thickness which are type high, but cut away on one side on the top. They prevent the wax from spreading out and act as bearers. The hollow part is inside. High spaces and quadrats should be used wherever it is possible, as low spaces require too much care and time to make a good plate. Copperfaced type and barefaced type should not be employed together in the same form, as, although the difference in their height is very slight, the copperfaced letters can readily be distinguished from the others when printed on finely-calendered paper. The pages ought to be read in proof for bad and defective letters before making the plate, as every fault is there perpetuated. Where there are blanks in the pages an inverted letter should be placed at the end of lines as a guide to the finisher and to secure the plate in a level position when it is shaved, and also where gaps occur, as in chapter headings. The pages should be locked up with numerous quoins and very tightly, far more so than is done in letter-press printing, as otherwise the wax may be forced between the letters, there being an immense pressure in the molding-machine. Before being molded the whole surface should be examined to see whether any of the spaces are sticking up and whether every letter is clean and dry. If there are wood-cuts, these should be made perfectly square and smooth in body, as otherwise they will throw the type off its feet. If too high they should be cut down to the exact level; if too low they should be underlaid. If low type is in a page with high that also should be underlaid; and brass rule, which is frequently higher than the type, should be lowered or the rest of the page underlaid to come up even with it. As soon as the form is ready an impression can be taken from it in wax. The type is in relief, and an indented matrix must be obtained from it, so that when the replica of the type is made it also may be in relief.

HEATING-TABLE AND WAX KETTLE.

The substance used for a foundation is ordinary virgin beeswax of good commercial quality, free from grit and dirt. It is heated in the kettle, and a small portion of turpentine and black-lead is then added to it. One authority gives as the quantity ten pounds of beeswax, two pounds of Venice or white turpentine, and three ounces of the finest powdered graphite. Spermaceti, lard, tallow, suet and oil are sometimes added to make the compound softer and less cohesive. But these substances are varied as to their quantities in different foundries and according to the class of work used, and also according to the fancy of the electrotyper. A heating-table is provided for warming the molding-case preparatory to filling, and also for melting the wax out of the case when the copper shell has been removed. Beeswax melts at 142 degrees. The molding-case is a flat plate without a rim, made from any metal, and its use is simply as a backing or stiffener to the wax upon it. Molding-cases may be made of any metal which is not acted upon by the solution used in the depositing-trough. Formerly they were made of copper or of brass, with a rim or edge about one-fourth of an inch in height; but the more general practice now is to use cases without rims and made of electrotype metal. These cases are cheaper in first cost, can be made by the electrotyper, are readily straightened when from any cause they become bent, and when worn out may be recast. There must, however, be rather more margin between the outer edge of the work and the edge of the case than when rim cases are used, but the loss of room is more than compensated for by the greater convenience in using them. The practice of shaving the wax on the cases is becoming general, as molders believe that the wax is more solid and free from impurities below than on the surface of the case as poured. The surface may be removed by the scraper alone, but it is a saving in time and a truer case may be obtained by taking off a thick shaving on a machine and afterwards using the hand-scraper to smooth the surface. For use with patent connection hangers it is customary to have a projection on one end, that the suspending-hook may not come into contact with the solution. As the height of the solution in the depositing-trough will rise as the cases are hung, it is well to have an overflow pipe properly located so that any surplus may flow into another vat, from which it may be readily dipped with a pitcher and added to the depositing-trough when necessary to raise the level of the solution.

The molding-case being ready and having been placed upon the table the necessary wax is poured upon it. Guards are placed around it about an eighth of an inch higher than its surface. The melted wax passes through a fine sieve to keep out any foreign substance, and is poured from a warm ladle to prevent chilling. Bubbles will arise more or less, which are broken by passing a hot iron through them. If the wax cracks in cooling it should be thrown back into the wax kettle and a little more turpentine added. But if the substance is free from flaws the next operation is to remove the guards, carefully cleaning them. This should be done while the wax is still warm, and immediately after the face of the latter should be carefully shaved upon a case-shaving machine. It is then black-leaded by means of a goat or badger hair brush. Another method is to mix plumbago with water in a bowl until it attains the consistency of cream, applying the mixture with a brush. The case should be wiped dry before the impression is taken. To

SCREW MOLDING-PRESS.

continue the electricity onward from the mold into its supporting-rod a narrow strip of copper is placed on the wax just above the top part of the mold and fastened down with wax. Clippings are used long enough to extend from the hanger to the mold, which, of course, must be covered by the solution. When the mold and form are ready for molding pull the table of the hydraulic press forward, so as to allow of the page or pages being properly placed in the centre. Place the case and form in proper position. The molding-case, if large, is then laid upon the form in the molding-press and an impression taken. Between the case and the platen of the press binder's boards are placed to the thickness of one-eighth of an inch, in order that the heat in the wax may not be lost too suddenly. If the form is small the case is laid on a bookbinder's board upon the table of the press and the form or cut placed upon it.

HYDRAULIC PRESS.

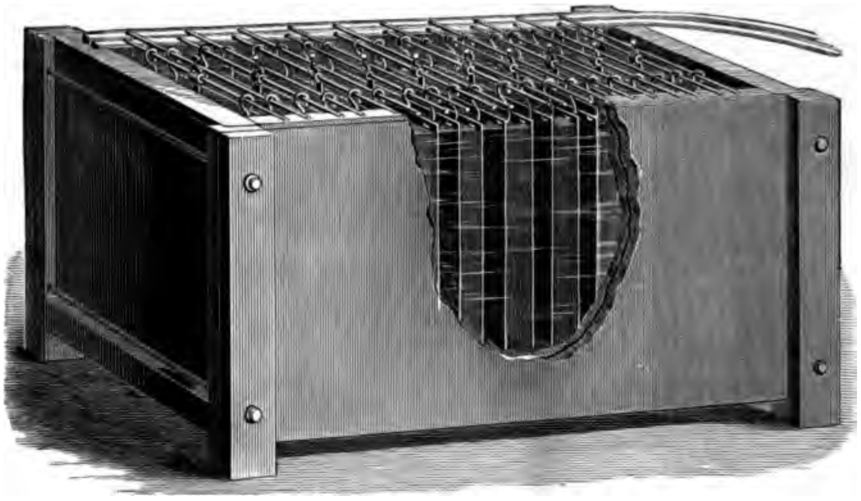
There are used among electrotypers three kinds of presses, which are known respectively as toggle, power and hydraulic. In the first a combination of levers gives the necessary force; in the second the usual multiplication of power is secured by gearing, and in the third by the pressure of water. All are powerful, but the last the most so. It is frequently the case that some important portion of the press breaks from an excessive strain. Some large hydraulic molding-presses exert a power of one hundred and fifty tons. If the hydraulic machines are used, push the table under the head and pump till the required resistance is obtained. This can be determined by experience or by dividing the quantity of total pressure shown by the gauge by the number of inches of surface. Even here, however, something must be left for personal equation. With small forms the depth required can be obtained by the short handle; with the large both will be required. The mold should be deep and sharp, and this can only be obtained by great pressure; but if too deep the face of the mold is likely to be torn when lifted. After the water has been allowed to run out from under the ram the table must again be drawn out. The wax will be found to have been forced out unevenly all around the edge of the form. It sticks to the type more or less, and to remove it pry apart the case and form gently at both ends with a screw-driver or similar tool, and then lift it squarely from the form; otherwise there is a danger of tearing the wax from between the type or of distorting the edges of the mold. Should it be perfect, which can be ascertained by close examination, it is ready to be prepared for building up. If the mold, however, is defective it is by far the best plan to make another, as no amount of repairing can make a good plate out of a bad mold.

Richard Clay of London, an eminent printer and an ingenious mechanician, some years ago devised a method by which molding could be done without a powerful hydraulic or toggle press, with or without low spaces. It consists substantially in repeating the impression, so that in the end there are no long, projecting points of wax. A thick iron frame, called a register frame, is provided slightly higher than the chase. On the inside are two long set screws fitted at right angles and with rather large heads. An ordinary Albion press is employed, the tympan being removed. The register frame is placed on the bed, and the form, having been black-leaded, is placed inside. The face of the type is covered with a piece of calico, upon which is placed a thin sheet of india-rubber sheeting. The pan containing the wax is next placed on the top of the india-rubber, care being taken to push the sides of the pan flush to the set screws in the register frame. A light impression is then pulled, when, after lifting the wax, it will be found that all of the whites have been almost sufficiently raised. Both the india-rubber and the calico are now discarded, the wax pan being placed directly on the type, the edges of the pan being pushed close to the heads of the set screws to insure the wax falling exactly in the same place. A moderate impression is pulled, when the mold will be found both sufficiently deep and sharp.

This plan has been followed in some English offices now for years with success, but has never gone into use here, as it seems to be unnecessarily slow. Great difficulty is experienced in making good molds where open or rule work is found. Rules without bevels, especially if thin, always cause trouble, as they do not open the wax sufficiently to allow the proper deposition of copper. In such cases the pressure must not be too great, as it is probable that in separating the mold will be torn or otherwise spoiled. The extra expense incurred in using thicker rules would more than be counterbalanced by the certainty of superior molds and consequently superior plates. Sometimes plates are made from other electrotypes, as in the case of engravings. It should, however, never be forgotten that each remove from the original lessens the sharpness and clearness of the fine lines, and consequently the goodness of the plate. This applies to type-work and to stereotypes as well as electrotypes. The plates should always be made from the original when practicable. If, however, one is to be made from another the plate should in all cases, when it is convenient, be removed from the wood if mounted. Otherwise the operator may fail in obtaining a good impression, as the wood gives slightly and may be uneven. It can easily be removed by thrusting a thin chisel between the metal and the wood. After the mold has been taken the plate should be at once refastened, to prevent its being mislaid. Wood-cuts should be surrounded by type-high guards and locked up in the same manner as type forms, in order to prevent the blocks from cracking. They should be carefully cleaned with ammonia or benzine and thoroughly dried before being

BLACK-LEADING MACHINE.

black-leaded. Lye should never be employed for this purpose, as it swells the lines and opens the joints. If fine cracks appear on the surface of a cut that is about to be molded apply to it a strip of moist blotting-paper about an inch wide. Upon this place a heated building-iron for a few seconds, or until the paper becomes partly dry, when the crack will have disappeared or nearly so. The cut must be immediately rubbed dry with a brush and black-leaded and molded at once, as the crack is liable to reappear. Plates used in type forms from which electrotypes are to be made should be mounted on solid metal bases.



PRECIPITATING TROUGH OR VAT.

When the mold is taken from the form it has depressions where the type has been pressed down, and prominences where spaces, quadrats or other hollow places appear. If molded with low spaces these prominences are higher than the plate is finally to be, and it is therefore advisable to cut them off, and it is generally preferable to do so even when high spaces are used. The mold is laid upon a flat surface, being slightly warmed, the operator taking a thin, flat-bladed knife about eight inches long, with the handle so inclined that he can cut with the blade at a true level. He heats this by inserting it in a gas flame or in a basin of hot water, and cuts away the projections as rapidly and as accurately as possible. The plate will not be spoiled unless the operator cuts so low down that one of the bottom lines is shaved away, although if below the shoulder the ink may gather on the counters. The knife is warmed at every cut or two, as otherwise a thin film of wax is formed over the bowls of letters. The wax which is cut off falls on the blade of the knife and is carried off by it, being stripped after each stroke. After the operation is completed the page is examined carefully to see that no little pieces of wax have fallen into the cavities. Burning down the mold is the next operation. Cutting away the projections and the high parts results in leaving little films of wax which extend the whites. Were they not removed they would be broken off and fill up the bottom of the mold. Consequently a gas jet about two inches long, coming from a nozzle held by a piece of rubber tubing, is passed quickly backward and forward over the mold. The flame shrinks back the film and rounds the openings, which allows the brush to enter the cavities and black-lead them properly.

After this follows building up. Large hollow places in the form, such as quadrats, will leave depressions in the mold, but as the force of the impression is exerted against the letters which show in printing the wax does not enter the quadrat places in sufficient quantity to make an even and uniform plate. Where there is a number of blanks together the roller, being elastic, enters the hollows of the plate and blacks them, the paper falling there also. Thus it is necessary to have the plate thinner in these spots than elsewhere. When this is to be done the wax must be thick. This is easiest done when the size is not great by building up; but where it is a considerable portion of the page a routing-machine will do the work better after the plate is complete. The building-wax is the same as that used in the wax kettle and is made in a mold three-eighths of an inch thick. When cold this is cut up into strips. Having taken the building-iron, which is hot, in one hand the workman holds a strip of wax against it in the other, the end of it being about a quarter of an inch above the mold. The iron touches the wax wherever it is desired to build, the latter dropping in a fluid form upon the mold. The wax must be perfectly dry and the iron of proper temperature. The operator should have a very steady hand, as great damage can easily be done here. Several irons are kept hot at once, so that no time may be lost in heating. He also removes the superfluous wax at the sides and trims the mold generally.

The building up being complete and the connection made, the mold is to be black-leaded. A small quantity of black-lead of fine quality is spread over it by a hand brush, and it is then put into a black-leading machine, where it moves back and forth on a special carriage against a brush until every portion is evenly but lightly covered with plumbago. There is a cover to the machine which shuts down when it is in motion and keeps any dust from rising. A black-leading box can be used instead. It is cheaper, but takes longer. This is of wood, with an opening at one end to insert a hand and brush. It has a glass top which slides back, allowing the mold to be inserted. This was used for some time before the machine.

After black-leading, the polished surface outside of the guard lines, except over the connection strip, is either waxed, burned or scraped away. This is done to destroy the conducting power in that part of the mold where the deposit of copper is not wanted. One method is to scrape away the black-leaded surface, thus destroying the connection between the parts in which no copper is desired. For this purpose a plumber's scraper is the most convenient tool. Merely touching the graphite with a heated building-iron prevents the deposit of copper there.

If, however, there should be any moisture in the case the hot iron will cause a sputtering of the wax, and is liable to injure the mold and cause holes in the shell. A common method is to brush liquid wax on those portions of the case and wax upon which no deposition is intended to take place. With a brush dipped in the liquid wax thoroughly cover that portion of the front that is not impressed. It should be remembered that copper deposit in those places where it is not required means waste of material, besides extra labor in afterwards taking it off. It is, therefore, important that all the parts mentioned should be painted over.

The excess of black-lead should now be washed out by water. Considerable of the powder remains in the cavities, particularly the bowls or counters of the letters. Sometimes this is done with a bellows, but it is best performed by a force-pump with a rubber hose to which is attached a sprinkler. The case is laid face up on a shelf in a trough, with sufficient water to cover the face of the mold to the depth of an inch or two. The sprinkler is then passed backward and forward over it and close to it. This must be done thoroughly if a good plate is expected. The jet of water displaces the air bubbles and the immersion prevents others forming on the mold. To facilitate this some electrotypers add alcohol to the water, as it has a great affinity for the wax, and in the action of rising to the surface displaces the air. Sometimes the mold is flooded with alcohol before being placed under the jet of water.

So far the processes described are mechanical ones. The next one is chemical and electrical. By the action of chemicals electrical or galvanic action is excited, and copper which has previously been dissolved is taken up and spread in a thin and even layer over all the hollows and interstices of the wax mold, becoming thicker the longer it is kept in the battery. Mechanically, we can only unite copper when in a state of minute subdivision by the action of heat. It would then form a thin but rough plate. But by galvanic action the particles of copper are separated little by little from the solution of sulphate of copper and united together as perfectly as if they had never been divided. The whole operation of electrotyping depends upon this. Copper leaves the solid mass to which it belongs, and by electrical action adheres in another place to a design or figure, depositing a thin shell over all the depressions and elevations it finds. In the older forms of battery, and indeed until the introduction of the dynamo, this was very slowly performed. The substances which could be used must be tested and devices invented to cause their use to be most advantageous. A very material discovery was made in this connection by Silas Knight of New York. By his plan, used in connection with the plumbago film, it was possible to cover the mold with a film of copper sufficiently thick to attract a further deposit, which then would be perfectly uniform. Without this the formation of the shell would proceed slowly, and the parts nearest the connections would have the thickest and those farthest from them the thinnest shell. His plan consists in mixing two pounds of sulphate of copper crystals with a gallon of water. This is known as a striking solution. The mold is laid face up in a trough, upon which is poured sufficient of the solution to cover it. There is then sprinkled upon it from a perforated box or sieve fine cast-iron filings free from dirt, oil or grease. Wrought iron or steel occasions trouble. This dust must be thoroughly worked by a brush into all parts of the mold. The iron having more affinity for the acid than for the copper, the latter is set free and thrown down upon the mold, forming a very thin but bright shell. The excess is then washed off with water from a hose, as the mixture is liable to heat and destroy the face of the mold. Should any spots remain uncovered the operation must be repeated. The brush must also be washed, as the iron filings may adhere to it and scratch the surface of the mold. When cuts are treated only the jet of water should be used in washing them.

Having thoroughly washed out the iron filings the molds should be set back to back and hung above the vat, the case being allowed to swing freely in the solution about one inch from the anodes or coppers. The battery vat should be on the inside six to eight inches longer than necessary to receive the full number of silver and zinc plates; two or three inches wider than the plates and two or three times as deep. The greater the depth the less frequently will it be necessary to make up a new solution. A good form of construction is to make one box, which need not be water-tight, of the required dimensions. Another box is constructed large enough to contain the first one and have a space on the sides, ends and bottom of one and a half to two inches. The smaller box should be secured in its proper position inside the larger one and filled with sand. Then fill the spaces between the boxes with melted asphaltum or roofing cement, an operation which will, if properly done, make a tight vat that will last for years. The upper edges of the tank should be even and true and covered with sheet-lead, which should lap down over the sides and ends two or three inches, a strip of copper being laid along each side for conductors, and wood or rubber being placed under the conductors to prevent a short circuit. Rubber is the better insulator, as wood is liable to become a conductor by being soaked with the solution. Care is necessary that the inner box shall be well secured in its position so that it cannot rise, as otherwise in use the heat of the battery will soften the asphaltum and force the inner tank upwards. A shallow tray made of a piece of two-inch plank scooped out to a depth of about one inch and placed in the bottom of the vat will catch any quicksilver that may fall from the zincs. A strip of wood about three inches by seven-eighths of an inch and long enough to extend above the solution, secured to each end of the tray, affords a convenient means of lifting the tray when it is desired to recover the quicksilver.

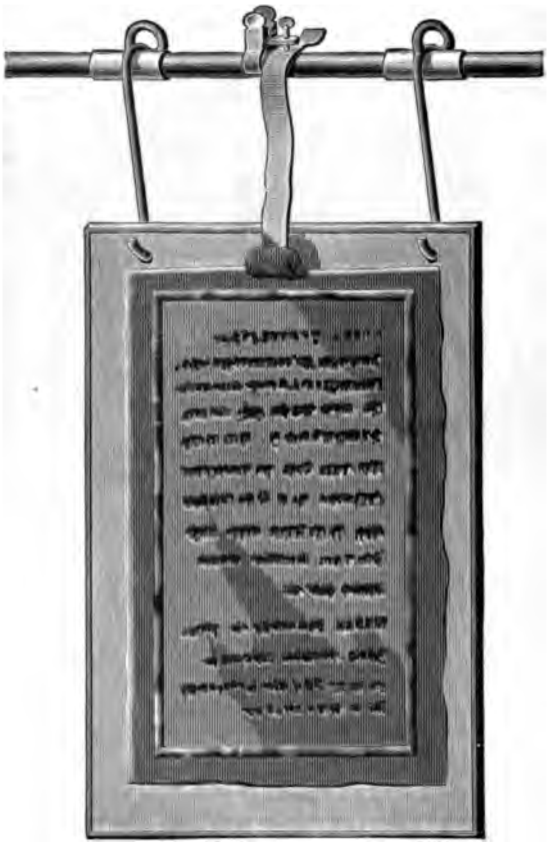
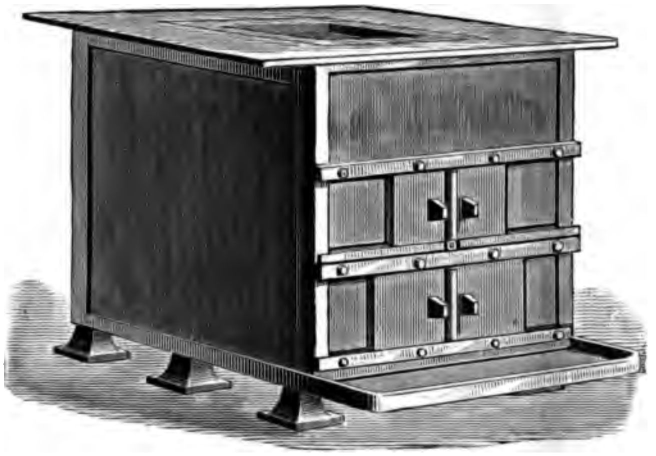


PLATE IN THE BATTERY.

The force necessary for the decomposition of the copper in the vat and the electrical action required for the subsequent adherence of the decomposed copper in solution to the mold is obtained by galvanic action. Smee's battery is the commoner form. For electrotyping, quantity and constancy of current rather than intensity are required. In Smee's battery two plates of zinc and one of silver are immersed in a solution of sulphuric acid and water. These may be inserted in a frame, which is then immersed in the fluid. A more convenient method, however, is to allow the zincs to depend upon hooks suspended from copper rods, by which method connection is made. In this way a zinc can be charged at any time without interfering with the battery. For small work this number of plates is sufficient; for a larger battery double this number should be used. The plates are about 12 by 12 inches, and should be thick. It is best to have them platinized, which prevents the liberated hydrogen from adhering to the roughened surface, and therefore polarization of the plate is prevented. When platinized, silver is more electro-negative than the pure metal, and therefore produces a stronger current.



MELTING FURNACE.

As the amount of the electro deposit is in proportion to the quantity of zinc absorbed by the battery solution, and therefore the wear of the plate, it will be readily understood that these plates last but a short time. As in the case of the silver, the zinc must be protected from the too violent action of the acid. This is done by a process of amalgamation with mercury. When purchasing it should be stated for what purpose the zinc is desired and the purest metal obtained, as the ordinary zinc of commerce is so much adulterated that it is totally unfit for this use. The grease upon the surface must be removed by washing in a strong potash solution. The plate should then be placed in a shallow pan about two inches deep, sufficiently large to admit of the zinc being moved about freely. Clean it with diluted sulphuric acid. Pour some mercury into a dish, adding a little sulphuric acid, and brush over the zinc with it. The brush should have short, stiff hairs. Both surfaces and the edges should be coated and well rubbed in. When this is completed the plate should present the clean and bright appearance characteristic of quicksilver. Stand on end to drain. The more mercury that is absorbed by the zinc the greater the amount of electrical action generated. Plates suffer much from local action or the eating away by sulphuric acid. When this is going on the amount of electricity generated for practical purposes is considerably reduced. So that besides the destruction of the material little or no work is being performed in the meantime. Duplicate zincs should be kept in stock. They should be periodically taken out and cleaned. This can be done either by dipping them into dilute sulphuric acid and washing in clean water afterwards, or by rubbing them with clean sand and a moderately hard brush. They should also be constantly examined with a view of deciding whether they require reamalgamating. The zinc plates selected should not be too thin. Those from one-half to three-quarters of an inch in thickness will be found most serviceable. The reason why rolled zinc is to be preferred to cast zinc is that it is closer in texture and easier to amalgamate; but cast zinc is on the whole more economical in use. The amount of copper deposited will theoretically be found to correspond with the quantity of zinc absorbed by the battery solution.

The vat is now ready for making the shells. In the solution are placed the cathodes, or plates of purest copper, a quarter of an inch or half an inch thick. Each plate has two holes by which it can be suspended from the S hooks. Formerly the power which caused the separation and deposition of the copper was obtained from a magneto-electric machine, but this has now been superseded by a dynamo-electric machine or dynamo, the distinction being that in the former a permanent magnet is employed, while in the latter its place is taken by an electro-magnet. Dynamos have a high degree of efficiency, transforming in some cases nearly 90 per cent. of the mechanical energy used in resolving the armature into the energy of the electric current. They also furnish the electric current much more economically as well as more regularly than a voltaic battery, as the zinc, the fuel of the latter, is an expensive and a poor fuel compared with the coal used for the power which drives the dynamo. As the current passes through the vat the solution becomes decomposed, its copper being gradually deposited on the cathode or mold, while the liberated sulphuric acid dissolves an equivalent proportion of copper from the anode, forming sulphate of copper, by which the strength of the solution is kept uniform, or in other words the copper is deposited on the mold at the rate that it is dissolved from the anode—that is, so far as the impurities of the anode will allow. When the molds are put into the vat they should be placed back to back on the rubbers of the cathode rod, the case being allowed to swing freely in the solution. The first mold should face the copper at the extreme end of the vat and should be immediately connected with the cathode rod. Other molds are placed in regular order until the last is placed in the solution opposite the anode nearest the dynamo. Everything should be perfectly clean. Much depends upon this. Should the solution be defective or the molds not properly black-leaded the copper deposit will show small black spots, especially on the side of the letters, which, if the shell is removed, turn out to be holes. When any of these appear the mold should be taken from the vat and rinsed with clean water, after which a thick solution of plumbago and water, or better still plumbago and alcohol, is rubbed into the defective parts by means of a moderately stiff brush. The mold is then hung on the anode rod and allowed to remain in the solution for about a minute, after which it is transferred to the cathode rod. By this means the defective parts will be properly covered with copper and a chemically clean surface insured, and consequently a proper adhesion between the old and the new deposit, which otherwise would blister or separate in the process of backing, is obtained. With a fairly good solution a substantial electrotype or shell should be obtained in from ten to fifteen hours. When it is desirable to test the thickness of the shell the mold may be lifted from the solution and a corner of the copper slightly raised from the wax by a knife. The usual thickness is from three to five one-thousandths of an inch. Experience will soon show the operator when the shells are sufficiently substantial to be detached. When properly backed a very large number of impressions can be obtained from such a plate. If when the mold is taken out it is decided that the deposit is not sufficiently thick it should be rinsed well in water and replaced.

When the copper shell is sufficiently thick the case is washed in cold water and laid on an inclined board near the sink. Hot water from a kettle should be poured on the shell, which will immediately become disengaged from the back. On holding the plate up to the light any holes may easily be seen. If this defect exists to any extent it may easily be attributed to defective black-leading, and a new shell will have to be made. If, however, there are only a few the plate may be repaired in the finishing process. The shell should be removed carefully and with some slight tension, in order to keep it straight and free from kinks.

SAW AND TRIMMER.

As a number of shells may be backed at the same time a sufficient quantity of metal should be in readiness for this purpose. The backing-metal and the copper shell having no affinity for each other, it is necessary to use a medium which will unite the two. Alloy metal composed of equal parts of tin and lead, rolled in sheets about one and a half thousandths of an inch thick, is used for the purpose of tinning the shells. It is laid on them and melted by placing the shells in the backing-pan and floating it in the metal kettle. Backing-metal is made by melting together ninety-one parts of lead, five parts of antimony and four parts of tin. This metal, in substantially these proportions, can be purchased in the market already prepared.

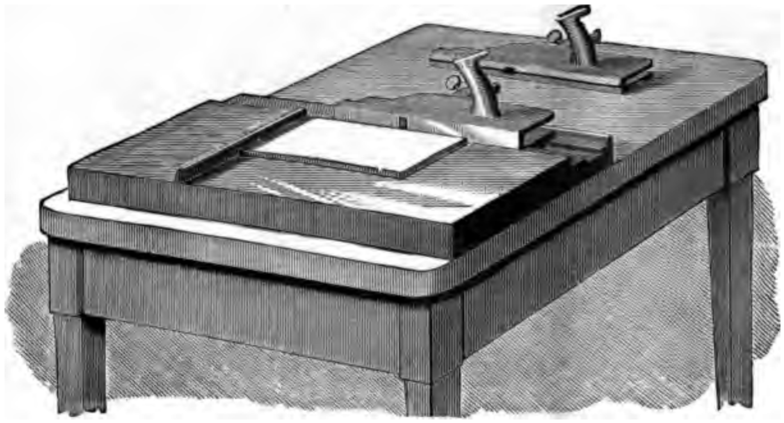
When the shell is removed from the wax a small portion always adheres. This is taken off by pouring hot lye over it and rubbing it with a brush. The lye flows back into the pot. The shell is then rinsed in cold water, and unless it is to be quickly tinned it is put in a small trough of water, which will prevent it from getting dry and warping. A little sulphuric acid should be added. The backing-pans should be allowed to rest on the surface of the metal pot until they are hot before placing the shells in position. In the meantime the latter may be arranged, and any tendency to curl at the sides and ends may be cured by laying a flat weight upon them. The back must be covered with muriatic acid by pouring in the acid, afterwards draining off the surplus. This solution is prepared in a wide-mouthed, glazed earthen jar or bottle. About one pint of muriatic acid is poured into a quart jar and half a pound of zinc is added. A strong boiling action takes place immediately, the fumes of which are very dangerous to persons having weak lungs. It is therefore better to make this solution in the open air when the wind is blowing in the opposite direction. When the boiling action has ceased and no more gas is given off the clear solution is poured into a wide-mouthed jar and about one-third of its proportion in water is added to reduce the acid, and one ounce of sal-ammoniac may also be used to neutralize the salts of zinc. When that is dissolved the solution is ready for use and is applied by means of a brush. Sheets of alloy metal are then cut to cover the entire surface; the shell is next placed in the backing-pan and lowered to the surface of the metal. The tin will soon melt, covering the whole of the shell with a thin film. If it fails in places a piece of foil must be added. It is necessary that the whole shall be covered, or the metal will not adhere in the bare places. The backing-metal should be poured on when the tin fuses, as otherwise the acid of the solution, which is a solder, will evaporate and leave the zinc in a soft condition on the shells. When the shell is properly covered by the tin the backing-pan is removed to the backing-stand; a heated perforated ladle is filled with the metal, which is poured on to the shell, beginning at one corner and gradually advancing over the entire surface until the necessary thickness is attained. When cool the plates can be taken out and passed to the finishing department. They are then about a quarter of an inch thick.

No amount of labor will make a faulty shell good; but much remains to be done in the finishing department after the rough plate is cast. It should be perfect as to letters, level back and front, trimmed squarely, and have bright, clean and accurately beveled edges. When the plate is removed from the pan it must be taken to the rougher and planed sufficiently to remove a portion of the superfluous metal. Then it must be trimmed close, care being taken to leave sufficient metal to form a good bevel. Owing to the thinness and consequent suppleness of the shell it will probably be found upon close examination that certain portions of the face are slightly uneven, being lower in parts. This may be ascertained by laying a small steel straight-edge across one end of the plate, and gradually moving it to the other end, allowing it to rest horizontally in front of the eye. Another method is to rub the surface of the plate with a hard rubber, such as is used in an ink-eraser. To this is glued a small wooden block. The low spots are left unpolished, and can be indicated on the back opposite the sinks by means of a marker or pair of callipers. The plate is laid face downwards on a smooth iron surface, taking care to have previously wiped away grit. The place indicated by the marking of the callipers is beaten with a polished and flat-headed hammer. This should be done very carefully, as undue force will damage the face. The face is again examined with a straight-edge, and if level is ready for the shaving-machine, when it must finally be reduced to the desired thickness. After leaving this machine it should be perfectly level in every respect. When this is completed the guards are cut off by means of a circular saw, and the plates are beveled on the sides and foot, leaving about a thin lead at the head. In the larger establishments a machine is used which on much work will bevel both sides at once. If

SHAVING-MACHINE.

the plates are intended to be worked with ruled borders it is absolutely necessary that they shall be trimmed exactly to gauge, for if they are larger, no matter in how small a degree, the rules will bind, and if too small the margins will not be uniform.

Plates not intended for patent blocks are generally styled job-work, and are usually trimmed to small-pica gauge, after which they are trimmed on all sides and mounted type high either on wood or metal. It is not necessary to make a large bevel, unless the plate is so nearly solid that there is no room for fastening. Mahogany is best adapted for mounting purposes, because when well seasoned it is not so liable to warp as other wood. A quantity of it should be purchased and stored in a dry place, to be thoroughly seasoned before being used. The block must be a trifle thicker than is absolutely required, as it is invariably uneven. It should be cut into pieces of convenient size and trimmed to the proper thickness by a plane, a gauge being kept for that purpose. Other woods used are oak and cherry. All should be free from knots or soft spots. Some operators fasten the plate to the wooden block by first puncturing a hole in the plate with a brad-awl, through which they drive a round iron nail. French pins with very small heads are well adapted for fastening the plate to the wood, as, besides being very tenacious when driven in, their heads can very easily be countersunk. After fastening the sides two or three nails should be driven into the body of the plate in positions where there are whites. In some classes of work, as, for example, newspaper advertisements, all should be driven into hollows and blank lines and none at the edges.



SHOOT-BOARD AND PLANES.

It is better to have newspaper work on solid metal bodies. In this the plate is heated and joined to the base by the use of a fusible alloy composed of eight ounces of bismuth, four of lead and four of tin. They may be soldered with a heated soldering-iron and a composition made of equal parts of lead and tin, or by laying the plate face down in a heated mold and pouring the melted metal upon it. The top and bottom of the metal bodies are shaved on the shaving-machine and the sides are squared on the trimming-machine.

Before the plates on wooden or metal bases are mounted, and before any plates are considered finished, they are examined and any defects rectified as much as possible. The blank spaces are cut down sufficiently low to prevent the ink from blacking the paper in printing. This is best done by means of a routing-machine. After the plates are routed they are carefully examined, and all the unnecessary matter likely to show in printing or which may have been left in routing must be cut down below the shoulder of the type. All battered letters should be touched up and reshaped, if possible, or new type should be inserted in their places. A hole is cut for the type and the letter is inserted from the back, after which it is cut off and soldered in. If much space is covered it is better to reset the matter, make a new plate of just that size, cut out the old matter and insert the plate with changes. The blank spaces should be carefully looked over to see if any type or parts of cuts have been built off with wax in the operation of raising the blank spaces in the mold. Electrotypes from wood-cuts or from other plates frequently need to be touched up. The finisher's bench should be in a position where it will have the benefit of the light. A leaden slab, about half an inch in thickness and twelve inches square, will be found the most convenient material to work upon, as, besides affording a solid foundation, the tools employed will not become injured in case of a slip or in piercing.

The tools, machines and accessories required in a large electrotyping establishment are numerous. The backing-pans have been sufficiently described. The wax table and kettles are used for warming and melting the wax. They may be with one or two kettles. In the latter case the wax may be dipped and strained into the other after the moisture has evaporated. The kettles are from nine to twenty-five inches in diameter, and the dimensions of the table, which is heated with gas or steam, are from two to three feet the longer way. Case-filling tables are made of iron; molding-presses are of several kinds, the strongest giving a pressure of about a hundred and fifty tons. In the black-leading machine the brush is very large, and the form goes back and forward beneath it. When in use, all of the working parts are covered up, so that the dust shall not escape. The black-leading box is of wood, with a glass top. Batteries and depositing-tanks are made of wood and are lined with lead, the joints being burned, not soldered. The precipitating-trough is well shown by the engraving. Furnaces are provided with great kettles at the top and a fire beneath. Square kettles are used for electrotyping and round ones for stereotyping. Various circular saws are employed. The object to be sawed is laid upon a table and is pushed towards the saw. The roughing-machine is the planing-machine used for obtaining a level plate immediately after the casting is done. After this, and when the other necessary operations are performed, the plate is shaved. This is done either by power or by hand, making two classes of machines. Another machine designed to cut away parts of the plate is the trimmer, which is much smaller than the shavers or the roughing-machine. The routing machine cuts out, by a rotary motion, all parts which must be made low. A beveling-machine trims away the edges at any angle desired. Jig saws and wood planers are necessary. Several kinds of ladles are used, and there are safety hooks and clamps for use around the battery. The finisher requires a great variety of tools, most of them similar to those of an engraver on steel. A great many brushes are required.

Nickel, brass and steel, as well as copper, are deposited by means of the electric current. The former is applied upon copper. It is very hard and protects the plate much better than the same thickness of copper. An edition of two hundred thousand copies of a magazine, it was found, did not entirely wear off the nickel which was thus deposited. The solution used is three-quarters of a pound of double sulphate of nickel and ammonia to each gallon of water. Only a thin deposit can be made, as otherwise the coating will separate from the underlying metal. Brass facing is not attended with any particular advantage, and it is difficult to deposit an alloy of two metals. Steel or iron facing is used to coat an electrotype of a steel or copper plate. As many of the lines are very shallow it is impossible to get the requisite pressure, and a mixture composed of gutta-percha and lard is consequently used. On this the deposition is made in the ordinary way, but as the whole plate must be made, instead of a film, the process takes much longer.

It is well understood in printing that an electrotype is superior to a stereotype plate, the copper forming its face being harder and more durable than type metal. The use, however, of electrotypes on web or perfecting presses has been regarded as objectionable, owing to the difficulties attending the formation of a true curvature of the copper shell. The practice hitherto has been to first produce a shell on a flat mold or matrix, and then bend the shell to the required curvature. This method, owing to the sharp and varying angles of the type and cuts, renders the shell liable to crack or bend irregularly, which makes the plate worthless for printing purposes. A new and practical method, the joint invention of P. M. Furlong and G. H. Benedict of New York, which has lately been introduced, does away with this difficulty, and consequently with the bending of the shell. By this method the shell comes from the bath curved as required, and the plate may be cast in the ordinary curved casting-box. Machines employed for shaving the back and beveling the sides of stereotype plates may also be used on electrotypes when cast by this method. The inventors claim a process for producing cast curved electrotype plates for web or perfecting presses, which consists in depositing a shell on a curved mold or matrix, tinning the shell in a curved tinning-pan and backing it with suitable metal in the ordinary papier-maché casting-box. The matrix backs upon a flexible convex brass plate, which has been temporarily straightened. As soon as the mold is made the plate is allowed to regain its former shape, and the wax accommodates itself to its backing. When placed in the bath a curved anode is against it and the shell is consequently a curved one. The Agricultural Report, a United States Government publication, was printed on a perfecting press from plates produced by this process at the electrotype department of the Government Printing-Office at Washington, D. C., when Mr. Furlong was foreman of that department. These plates were subjected to the most severe tests and were examined after 300,000 impressions had been taken (from one set of plates), and pronounced to be in excellent condition.

Another improvement is also the invention of Mr. Furlong. It consists in the employment of a highly-tempered plate, preferably steel, in connection with a bending-machine having a bedplate with a concave cylindrical surface and a bending-die formed of the segment of a cylinder and operated by a screw held in a sustaining arm or bracket. When the plate is made it is placed in this bending apparatus, pressure being applied by this curved elastic steel plate against the face to prevent breaking of the copper. A piece of pasteboard is placed between this and the face of the electrotype to prevent injury. When the requisite curvature has been reached the elastic steel plate is clamped, the screw is relaxed, and the plate is ready for use; it is then beveled on both sides and top and bottom. By the use of this simple and inexpensive appliance it is found in practice that electrotypes for printing high-class engravings or the most delicate types may be bent to the true arc of a circle without fracturing or mutilating the printing surface. The curved electrotype plates used in printing the Century and St. Nicholas magazines are now produced by this process.

Still another method for bending flat electrotype plates to the true arc of a printing cylinder has lately been patented by Mr. Furlong, and is now used successfully in curving the plates from which the Youth's Companion is printed.

This method consists in the use of a flexible steel plate attached to a cylinder mounted on an iron table, having bearers (the thickness of the electrotype) on which the cylinder revolves. These bearers are used to maintain a suitable distance between the table and the cylinder in order to relieve the electrotype from undue strain and pressure. To produce the desired results the electrotype is laid face down on a cardboard on the steel plate; as the cylinder revolves the electrotype is wound tightly into the space between the cylinder and the flexible steel plate, so that the back of the electrotype is caused to conform exactly to the surface of the cylinder, while the outer or printing surface is given a true cylindrical form without in the slightest degree impairing the sharpness of the characters thereon.

Electrotyping is usually carried on in conjunction with stereotyping where any of the latter is done. Sometimes it is an adjunct of a printing-office when the latter is a large one. It is advisable, wherever practicable, to have four departments, one for taking and preparing the molds, one for the battery, one for backing and one for finishing. Good ventilation is always a necessity, but in no case more so than when a battery is at work, the hydrogen gas given off from the chambers being both unpleasant to the senses and injurious to health. When a dynamo is used it is not so important that the battery-room shall be partitioned off as that the backing-room shall be so separated. The last should be extremely well ventilated. A bench about two feet wide should be provided for building purposes. This should be in front of a window, as it is absolutely necessary that there shall be plenty of light. A small gas-stove should be provided for heating the building-irons. Two or three iron imposing surfaces will also be required in the foundry for laying up forms and reimposing them when necessary. In the battery-room receptacles must be provided for the proper and safe storage of acids, mercury, and so on; a shallow cupboard, with lock and key, is best adapted for this purpose, as, besides the danger attending unrestricted access to materials of this description, unauthorized interference with or additions to solutions may cause endless trouble and expense. Glass-stoppered bottles should be used for keeping the chemicals, their size, of course, being regulated by the amount required to be kept in stock. Sulphuric acid is usually supplied in large carboys. The action of the acid will speedily destroy a wooden floor, and this being the case the battery-room should have either a brick or stone foundation. Thick sheet-lead can, however, be easily fastened to wooden flooring, and answers very well.

Electrotyping, as applied to type and wood-cuts, is of comparatively recent date; but the deposit of one metal upon another by the aid of galvanism is not new. The voltaic battery was constructed in 1799, and about 1802 Wollaston demonstrated that if a piece of silver in connection with a more positive metal was put into a solution of copper the silver would soon be coated with the inferior metal and that the coating would stand the operation of burnishing. The first constant battery was discovered by Daniell in 1836. In 1839 Professor Jacobi, at St. Petersburg, discovered how to turn a line into relief, while at about the same time C. J. Jordan and Thomas Spencer each made improvements showing that the art could be made useful in printing.

Little notice was taken of these discoveries by the scientific public, and they fell dead; but experiments did not cease. Smee invented his battery in 1840, and Savage showed in his dictionary the next year several impressions from electrotypes reasonably good in quality. A cut made by this process appeared in the London Journal for April, 1840, and in the same year Joseph A. Adams, an American engraver, who had been experimenting in this matter for two years, produced an engraving which was published in Mapes's Magazine.

Adams was the first person who called the attention of any large number of persons to this process, as he employed it to make illustrations for Harper's Family Bible, issued between 1842 and 1844; but his processes were very imperfect, as the wood-cut was spoiled while making the plate.

The first professional electrotyper was John W. Wilcox of Boston, who was the foreman for Daniel Davis, a manufacturer of philosophical instruments in that city, and who had himself made an electrotype. Mr. Wilcox, in the autumn of 1846, met J. G. Chandler, a wood-engraver, who told him that if he could repeat what Mr. Adams had done he could be certain of an abundance of work, and offered to lend him cuts to experiment upon. In less than sixty days he had in use every essential principle known twenty-five years after, the battery and decomposing-tub, wax composition and pan, water jet and backing-pan.

In December, 1846, or January, 1847, Wilcox began making electrotypes regularly for printers, publishers and engravers. The business enlarged, and others soon embarked in it, although he had kept the process a close secret. William Filmer began in Boston in 1850. Many improvements were made, among them Knight's wet process, and late in the fifties it was acknowledged that for all cut-work it was far superior to stereotyping. In 1873 the dynamo made its appearance, by which the time of making a plate was much lessened, and some establishments which had previously done electrotyping and stereotyping abandoned the latter process, as the former could make all that was necessary, and there was no necessity for having two sets of machinery for doing the same work.

At that time electrotyping was worth about 5 per cent. more for the same surface than stereotyping. Successive improvements have, however, lowered the cost very much. There are now about six hundred journeymen electrotypers in the city of New York and about thirty-five offices. This is about a quarter of the whole number in the United States. A small electrotype-foundry, employing eight or nine men, can be put up for two thousand dollars.

For information on this subject we are indebted to C. B. Cottrell & Sons, the Lovejoy Company and R. Hoe & Co.

Elegy.—A mournful or plaintive poem.

Elephant.—In England a size of printing-paper, 30 by 23 inches; writing or drawing paper, 28 by 23 inches; brown paper, 34 by 24 inches. In America, a size of flat paper, 22¼ by 27¾ inches.

Elevado (Sp.).—Superior letter or figure.

Elevators.—These have now become indispensable in all large printing-offices, both for the conveyance of passengers and of freight. They are known in England as lifts or hoists. While necessary, certain grave dangers attend their use, as they may cause injuries to the person and loss of life, and they are the means by which fires very frequently spread with rapidity. It is agreed by architects and fire-insurance men that the elevator shaft ought to be a separate construction at the rear or side of the principal building, the walls of which should be of the regular thickness, and that the opening to the shaft when the elevator is not in use should be closed by iron doors; but unfortunately this cannot always be done, as frequently the building covers the entire area of land. The reason why the elevator should be in an annex is that it may not act as a chimney. In an ordinary building, if a fire begins on the lower floor it is some time before it reaches the second story and still longer before it reaches the third; but when the common elevator shaft is put in a building of brick and wood this vacant space makes an excellent chimney, and the flames and sparks carried up such a flue ignite the uppermost story almost as quickly as they do the second. This is guarded against by making the frame-work of iron or by facing the wood-work with iron plates and by having doors which shut down automatically where a floor would be, if that were continuous. A wooden trap-door would check the current of air as effectually as an iron one until it was burned away.

A second class of dangers comes from the door of the elevator being left open so that a person might inadvertently walk into the elevator well, falling until he reached the bottom. In true elevators the door should always be closed and fastened, unless the floor of the car is at a level with the other floor, and it should never be of such a kind that it can be opened from the outside except by a key, which should be in the custody of the elevator man. But there are also lifts and hoists which are not constructed with the same care as an elevator, and which are separated from the remainder of the floor only by a little gate or by a rail. These should always be closed by trap-doors, except when the hoist is in actual use, and then there should always be some person at each floor when the gate is open. If the elevator is in a dark corner a gaslight should be left burning; the same rule should be observed with any elevator after nightfall, no matter whether the hoist might be in use or not. A third danger is from the falling of an elevator. The rope or chain above breaks, and those who are in the cage fall to the bottom, rarely escaping without broken limbs. Several devices are used to overcome this liability to accident. A second rope, a little looser than the other, will hold the elevator if the first breaks; a fall faster than ordinary causes in some makes automatic clutches to spread out and seize the sides; and the loss of tension on the rope will allow projections to be thrust out which will hold the car. Elastic cushions at the bottom of the well help in some instances to check the concussion which might be expected if a car fell. A comparatively rare danger is where the rope becomes kinked or knotted, thus pulling the elevator up against the roof.

The elevator of a printing-office ought to be neat enough not to repel passengers. Among those who are compelled to visit the printer are ladies as well as men who are recovering from sickness, are lame, or troubled with heart disease. They leave the printer who has no modern facilities and go to him who has. Unless the elevator is very large and powerful, heavy machinery should not be taken up by it; but paper, cases, type, ordinary furniture and things which are not heavier than two men can lift may very well be transported. In the manufacture of elevators American inventors are unequaled.

Elision.—A letter or letters taken out of a word, which is then pronounced in its abbreviated form, as don't, ne'er, o'er.

Ellipsis.—Marks indicating the omission of letters of a word, words, parts of a sentence or paragraphs or pages. Thus in Tristram Shandy there are in one place five chapters omitted. Asterisks (* * * * *), dashes (———), leaders (.....) and sometimes other marks are used to indicate an ellipsis.

Elzevir.—The name of a celebrated family of printers in Holland who flourished during the sixteenth and seventeenth centuries. They had presses at Leyden and Amsterdam, and publishing places at the Hague and at Utrecht. Twelve printers of this name are known. The earliest, Louis Elzevir, was born at Louvain, but established himself at Leyden in 1580. His youngest son, Bonaventure, published an edition of the classics in duodecimo, which is still much sought for. A grandson of Louis, also named Louis, brought out many magnificent works in Amsterdam, where he founded a press. Daniel, who was the son of Bonaventure, printed both at Leyden and Amsterdam; he died in 1689. Another famous printer was Abraham. The Virgil, Terence and Greek Testament issued by this family were regarded as their masterpieces. They did not aim at elegant work in the same sense that Bodoni and Baskerville afterwards did, although their printing was well done, and they published many small books. The total number of works issued by them was 1,213. Many were without their imprints, as considerations of expediency forbade, but a comparison of the type and the ornaments conclusively fixes the printers. Several books have been published upon this family and their work.

Elzevir Type.—Letters cut in imitation of those used in the sixteenth and seventeenth centuries, and resembling those used by the Elzevir family. They went out of use in the reign of George II., when Caslon began cutting his faces, but have been revived within the last dozen years by a distinguished Parisian type-founder. Lately three American founders have brought out faces which closely resemble the original, although differing from each other slightly, and it is probable that these faces will for a long time be used for neat work, where the body of composition is not large. They appear much sharper and cleaner than the originals, as the presswork of to-day enables more justice to be done to them. Lines of Roman, Elzevir and old-style capitals are here given, that the difference between them may be seen:

GREATEST OF MODERN TYPE-FOUNDERS
GREATEST OF MODERN TYPE-FOUNDERS
GREATEST OF MODERN TYPE-FOUNDERS

Em.—The square of a body of type. The common method of measuring in America is by ems, but in England by ens or letters, which are assumed for this purpose to be ens, although as a matter of fact they are considerably thinner. The number of ems in a line is multiplied by the number of lines, and the result gives the quantity set. Tables for facilitating this calculation are used in every newspaper office, but in book offices the varieties of sizes of type are so numerous and the number of measures is so great that few find them convenient.

Em Dash.—A dash (—) an em long, used as a pause, an indication for something to follow or a ditto mark, or for the composition of tables. In England it is known as an em rule.

Em Quadrat.—A quadrat with a square shank. It is supposed that its name is derived from the letter m, which in size comes nearest to it of all the small letters. It generally begins a paragraph, although in wide measures the indentation may be an em and a half, two ems or even three ems, and it also is used to separate the period at the end of a sentence from the word which follows. In this place it should not be increased equally with the other spaces in the line, and it should be the first diminished. In France only a thick space or an en quadrat is used in such a position. Em quadrats are much used in tabular work, and are indispensable in their justification. Measures are not set with em or larger quadrats, but with the requisite number of m's laid on their sides.

Em Rule.—The name in England of the character which is known in America as an em dash.

Embossed Press.—A machine for raised or embossed stamping.—*Jacobi*. In this country such a press would be called an embossing-press.

Embossed Printing.—Printing in which the surface is in relief. The part which shows rises towards the reader, and consequently the impression must be made from the back, but with types or characters which are not reversed. It therefore in nearly all cases involves the cutting of a brass die, which is locked up in a chase, if the job is to be done on the printing-press; but if the paper upon being laid upon the die strikes squarely against a flat metallic surface only a very slight impression will be made. To admit of the distension of the paper a counter is made, and this is cut away where the die is raised, and is in relief where the hollows are to come. Leather, pasteboard, lead or india-rubber can be used for this latter purpose. Thus the inequalities in the die and the reverse exactly fit each other, and the paper takes the form desired. When the embossing is done in this way there is no color upon the top of the letters. This can be put on by placing upon the bed of the press a block of wood, nearly type high, which is inked at each impression. The sheet is brought up against the board where the jaws come together, and the color is left upon it. When there are only a few copies to be done a hand-roller can pass over them, or color can be applied by a brush, skillfully handled. Another way is thus described by Lynch:

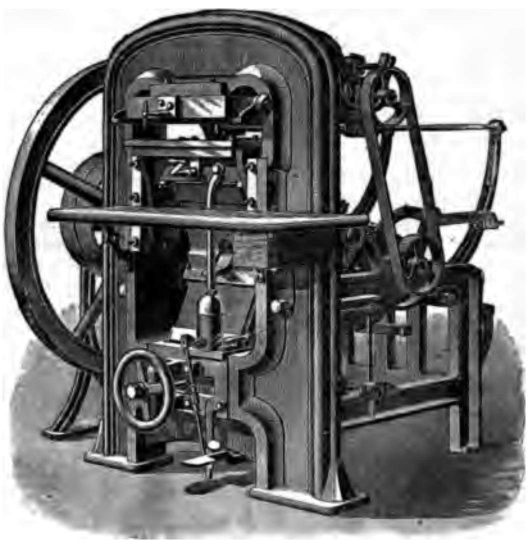
"This description of printing is done by using metallic dies, into the surface of which the lettering has been cut or punched. The counter die is made by cutting a piece of thick, smooth leather to the size of the die; the side which is to receive the impression must now be moistened, and, being laid upon the surface of the die, a sufficient pressure must be given to it to make the leather go into all of the cavities in the plate. The counter is then to be removed from the die and its edges trimmed so that both will be of the same size, after which the leather must be adjusted to its place on the face of the die and its back covered with a thick mucilage; another impression must be made, so as to transfer the counter to the tympan. A thin sheet of gutta-percha should now be warmed on one side and laid upon the face of the plate, with the side which has been heated uppermost. An impression must again be made, by which the leather and the gutta-percha will become attached, the result being an elastic counter which will retain sufficient firmness to throw up any part of the under surface of the card without breaking the parts at the edges of the letters. When the job is of large size, such as a show-card, the counter die may be made by pasting ten or twelve sheets of smooth paper together with mucilage, and when they are in a damp state to press the die into the pulpy mass and leave it to dry before they are separated. The printer must be careful in his choice of ink. Whatever color is used should be strong in body, and the roller must be passed over the form in all directions so as to secure a perfectly uniform coating of ink. The form must be cleaned, as occasion may require, by the application of spirits of turpentine with a brush."

Printing for the blind is embossed. The types to show on the first, fourth, fifth and eighth pages of a sheet must be applied on the second, third, sixth and seventh pages, with sufficient force to cause the impression to stand up half a nonpareil.

In bookbinding, embossing is stamping a design or lettering upon the cover. In order to secure the requisite stiffness these covers are made thick, pasteboard or tarboard being in the centre, paper inside, and cloth or leather on the outside. To print against this outside brass dies are used, which can be heated if necessary in most presses, the bed and platen or the two jaws coming together with perfect evenness and squareness and compressing the cover where that is needed. The area of the cover of a book is much less than that of an ordinary sheet of paper, being in octavo not more than 10 by 15 inches, and in quarto not more than 12 by 18 inches. Thus the requisite pressure can be attained, as the surface is much less than in ordinary printing, while on many covers there are only a few lines to be marked. It should be noted that while this press is called an embossing-press and the result embossing, the machine is really an indenting-machine, and the consequence indenting. All lines of the die are driven into the cover, and the parts which are really embossed are the waste places or blanks. The three methods of pressing in gilt or in antique, or with printing-ink, each require different procedures, and the result is different. Fine calf or morocco work is tooled instead of being embossed, little designs being pressed in singly by the hand until all is done. In England embossing is known as blocking.

Embossing-Imprint.—A very useful invention of Henry Wilson of Chicago, by which, at the same time that an impression is made with ink upon a page or job, another impression can be made in white, containing an imprint.

Embossing-Press.—A machine employed chiefly in binderies for impressing the designs or titles upon the covers of books. Two distinct forms are known. One resembles the ordinary job printing-press, and it is fed in the same way. It is, however, far stronger and heavier and gives an immense pressure. Contrivances are made by which, with the help of gas, the plate or die can be kept hot. This is necessary where gilding is to be done. But generally this kind of embossing-press is employed on work with printing-ink, or where the design is blind, with no color or gilding. In these latter two cases the machine is treated very much like the ordinary job-press. When size or ink is necessary, rollers and a distributing surface are required; where neither is used the rollers can be taken out. The other form is older and stronger, having only a knuckle-joint and its supports to give way. The cover of a book is placed between the jaws, which then close. The operation is much slower than with the job-press, but is correspondingly more powerful. This is very necessary with large designs. Each of the makers has several forms and sizes of embossing-presses. One kind of embossing-press is operated by hand, and is used to stamp leather, stationery and stationery novelties. It has a screw similar to a letter-press.



MONTAGUE EMBOSSING-PRESS.

HAND EMBOSSING-PRESS.

Emerald.—The name of a type in England one size larger than nonpareil and one size smaller than minion, equal in that country to half an English in body. The corresponding name here is minionette, which is not far from six and a half points on the point system, and is smaller than half an English. Emerald is chiefly used in England upon daily newspapers, being a favorite for Parliamentary reports. It was introduced about the year 1839.

Empapelar (Sp.).—To cover with paper.

Empaquetar (Sp.).—To pack up the printed sheets; to paper up matter.

Empastelar (Sp.).—To pi.

Emperor.—A size of writing or drawing paper, 72 by 48 inches, used in England.

Empire Machine.—A small job-press manufactured by Powell & Co., London, England.

Emptied.—When a composing-stick or galley is full and the type is lifted out of the stick or off the galley the stick or galley is said to have been emptied.

Empty Case.—A case with the type so set out that the workman cannot proceed. A considerable portion remains, however, in the shape of capitals, small capitals and upper-case sorts and in the less used sorts in the lower case. Every kind of copy runs on sorts, and if the case is at all even this will hardly ever happen to run from the same box for two days in succession. If only one or two boxes are short and there is nothing to distribute, sorts may perhaps be borrowed from another case, but if many men run on the same letter composition must cease until more type is available. An empty pair of cases, or what is commonly called so, will contain from ten to fifteen pounds of type. When they have been employed for a long time, and the fonts that have been contained in them are finally sent back to the typefounders to be melted, the cases should be examined to see whether they are in good condition. If they are not perfect they should be repaired and freshly lined before being used again. Empty cases should be placed in a storeroom apart from the compositors. It will frequently be found that in an empty case, when the type remaining is about to be thrown out, there will still be left sorts in the upper one which are perfectly good. It is policy to save them if the same font is to be duplicated. Some experienced compositor, whose judgment can be relied on, is employed to set up the letters still left, and is given instructions to discard all worn-out, broken or battered letters. In sorts such as æ and œ and in the reference marks it may happen that a few letters at the top of each of these boxes are worn out, while below many have not once been on the press. In a full font there may be many such letters. All type is cast so that there shall be a larger number proportionately of little used letters than of those much used. In actual employment the letter e occurs as often as once in ten times, but only thirty e's are cast to one x. Yet practically one hundred e's are used to one x. This is done so that in case there is a run on x there may be no difficulty in supplying the sort. This disproportion of use to quantity is found in all the boxes except a dozen, and of the two hundred or more letters in a complete font no more than forty are certain of being fully used.

Empty Press.—A press unemployed. In general every printing-office has one for a proof-press.—*Stower.*

Emptying.—1. To take matter out of a stick and deposit it on a galley. This is a very difficult thing for an apprentice to do, and much that he tries to empty is pied. The matter in the stick, if well justified, yields readily to the touch of the hand. It is first canted up at the bottom and then at the top. When high enough for the workman to clasp securely on all sides, he puts the first finger of his right hand against the last line of the stick; his second finger, bent, against the end of the lines, and the thumb against the bottom. The left hand clasps in a similar manner the beginning of the lines. Having seized it, with a little pressure he pushes down the stick and raises the matter free from it. This is then deposited upon a galley, placed usually upon the next frame, if in a job-room, or upon a standing galley if in a newspaper room. It must be set down perfectly square and level to the galley, or the letters will fall down at the front or back in the one case, or the type will be off its feet in the other case. A composing-rule is used at the end of the stickful to give it the requisite stiffness. Inexperienced persons also use a brass rule at the back of the stickful when the matter is solid. 2. To take matter out of a form or from a galley and deposit it elsewhere. The type is usually wet. After a daily newspaper is worked off it is laid up on a stone, and one of the weekly men, who has been given a marked paper, takes out or empties the matter according to its marks upon galleys, standing galleys or other receptacles of type. Part is dead, while part is saved for use in a weekly or semi-weekly edition. The type, being wet, is opened by the motion of the fingers sufficiently to insert a steel rule; this pushes down the matter enough for the fingers to enter, and four or five inches farther down the process is repeated. The rule is placed at the bottom of the handful, and two fingers of each hand are placed against the rule, the thumbs being at the other end of the handful. When the handful is lifted the weight should rest on the fingers and not on the thumbs, as the matter is sometimes held for a considerable time, and it can be held very easily in the way just described, while if the type is higher than the thumbs they very speedily become fatigued.

Emptying Galley.—The place where the compositors on a daily or other newspaper empty their matter. This is usually about the height of a table at the lower side, ascending by a gentle inclination towards the back. Cleats are nailed to the top at intervals of ten inches or a foot, and against each one of these the galleys are laid, the heads all being placed one way. It is usual for the first compositor on an article who empties to pick out a galley, putting his matter where he thinks it is likely to be when the other takes are emptied. As fast as one galley is closed up it is taken away and proved and a new galley placed in its stead. At one of the ends of the emptying galley is generally a stand, upon which are a box of quoins and a number of sidesticks and foot slugs, while in some other place close by are the numbered slugs which serve to mark the ownership of the matter which has been set. Upon this emptying galley, too, are the brass rules, which indicate the end of an article, with the advertising rules. The emptying galley should be in the centre of the composing-room and easy of access to all the workmen. Abundant light should be provided, and the structure should be a firm one.

Various contrivances have been used to show when the matter has all been emptied on a particular galley. One consists of little pieces of paper with the take marked upon it, as 7A. When completed a line is drawn beneath to indicate completion, and the compositor closes up the matter next below him. In other places chalk is used to mark the galley or the emptying galley. It has the advantage over the other that it cannot be blown away, as the paper can, on summer days when the windows are open. Three tiers of galleys are as many as can well be laid on one of these receptacles. Underneath them it is very common to put galleys that have been locked up and proved, but this is not good policy, as it interferes with the men who are going to empty.

En.—Half the width of an em of type. The common method of measuring in England is by ens.

En Quadrat.—A space which is half the size of an em quadrat. It is the largest space, those smaller being the five em, four em and thick space. In double-leaded matter and in the editorials of newspapers it is frequently used as the common composing space, and some printers use it in this way in poetry. When the line is not completely filled out, but lacks very little, en quadrats are substituted for thick spaces until the requisite tightness or justification is obtained. They are commonly also employed after an f, a colon or a semicolon, and after an exclamation or an interrogation when they do not end sentences. They are also used after a figure when it begins a paragraph, numbering it consecutively with other paragraphs. Here they set off the figure from the words, as in the numbering of the Bible. In composing tables en quadrats are used with figures, having just the same thickness, to the exclusion of all other spaces. Between dollars and cents in tables they are invariably used, and are frequently employed in the same place in reading matter. Columns of figures are generally set off from the perpendicular rule which follows by a line of en quadrats, if the space will permit.

The en quadrat occupies a double-sized box, taking the measure from the q, x or period, and is usually the next to the last on the right in the second row. There has been much talk about bringing the box closer to the hand, as en quadrats are needed very much in spacing out, and different situations have been suggested near the thick-space box. One plan takes the necessary room from the h box, and another from the t. But in spite of the undeniable advantages that would come from having the thin spaces and the en quadrats in a more convenient place, nothing has yet come of the suggestion. A bad practice prevails in some offices of allowing en quadrats of one size to be used as two-em quadrats of another. This is entirely wrong. The quadrats of one size should not be supplemented by the en quadrats of another size.

En Rules.—In England rules cast on an en of any particular body. Known in America as en dashes.

En Vélin (Fr.).—In vellum.

Enameled Cards.—Cards made with a very smooth surface by being enameled on one or both sides.

Enameled Paper.—Paper with a surface specially prepared, formed by a coating of clay or other mineral substance with or without wax and coloring matter, forced into the fibres of the paper and smoothed by hot rollers under immense pressure. It is largely used for covers and labels. It is objectionable to pressmen, as the surface is apt to peel off and often takes ink badly. Each side of the paper has a different finish. The commonest size is 20 by 24 inches, but 22 by 28 and 17 by 28 are sometimes found.

Encaballado (Sp.).—Squabbled.

Encabezar (Sp.).—To put on a heading or headpiece.

Encadrer (Fr.).—To put in a frame, as with a border.

Encerarse (Sp.).—To become dry (the paper which has been dampened for printing).

Enchasing.—Putting pages in a chase and getting them ready to print. The term is unknown in America.

Encircled Corrections.—In England, special or after corrections made in a proof and encircled in order to distinguish them from the corrections first made. They are here said to be ringed, and as they are commonly variations from the copy the compositor is entitled to pay for making the changes.

Encolar el Timpano (Sp.).—To cover the tympan.

Encre (Fr.).—Ink.

Encuentio (Sp.).—The blank left in a form in colors for another color.

Encyclopædia.—A work in which all knowledge, or a particular branch or subdivision of it, is treated exhaustively under separate headings, usually in alphabetical order. The word is also frequently used as cyclopædia. The great dictionary of Bayle was the first of these treatises under the modern idea. Ephraim Chambers brought out the first in English in 1728, which rose to five editions. This formed the basis of Rees's work. Among others published in Great Britain afterwards were the London and the Edinburgh, but the principal one for sixty years has been the Britannica, which has now reached its ninth edition. In France Diderot was the editor of one in the last century which had a vast and far-reaching influence upon the minds of men. It was a systematic collection of both facts and criticism. Others of size and value have since appeared in that country. Many have been written in Germany. From one of them—the Conversations-Lexikon—was taken the idea of the first American encyclopædia, which was finished in 1832, and was known as the Encyclopædia Americana. It was edited by Dr. Francis Lieber, and many Americans contributed to its pages. This work was well done, although at small expense compared with some which have since followed. No other was published until Appleton began the American Cyclopædia before the Civil War, under the editorship of George Ripley and Charles A. Dana. A second edition of this has been brought out. Johnson's Cyclopædia was edited by Dr. F. A. P. Barnard, and embraced more subjects than its predecessors. Other American encyclopædias are Zell's, the People's and Alden's Manifold. Several British works, such as Chambers's, have been published here with large American additions.

There are also many encyclopædias which refer only to a particular class of knowledge, as Ziemssen's Cyclopedia of Medicine, and these are sometimes as voluminous as those of a general character. Publishers have found that encyclopædias are good property, as they sell for a long time and do not quickly become dead stock. The modern management of the best encyclopædias is to have every article written by an expert instead of by ordinary literary men, who perhaps have no special knowledge upon the subjects which they take up. Encyclopædias require much type, as proofs are altered very much and must be revised again and again. It also happens that the writer who is charged with a certain article, from some accident or misfortune, or from procrastination or laziness, does not have his copy ready when he should, and therefore must be waited for. This would be a very serious misfortune if the compositors' and revising editor's work stopped at the same time. It is therefore generally the custom in a many-volumed encyclopædia to have enough type on hand to set up a volume. In this case an author could be waited for three or four months, if it was thought best, or some one else could prepare his article.

End at a Break.—To finish in composing at the end of a paragraph.

End Even.—To finish copy at the end of a line, although not a paragraph. This is very rarely done except on a daily newspaper, as it destroys the evenness of appearance of good work. It will frequently happen, however, on a daily paper that copy will come in which should not be divided into paragraphs, or that late at night matter is going out where paragraphs cannot be made, as sentences do not end where the exigencies of the composing-room require that they should. In this case the copy is divided into takes of the same length, and each man is told to end even. If his take is from twelve to fifteen lines long, the copy being regularly written, and he is a man of experience, he does not generally find much difficulty in doing what he is told. But if the take should be no more than six or seven lines and is irregular he may sometimes be obliged to run it over from the beginning in order to make it come out right. When he begins composition he notices what proportion his first two or three lines bear to the whole amount of copy. If he has twenty lines of copy, and four lines make three of type and a little over, he should begin wide spacing as soon as he is certain that this is the true proportion, so that the copy may make sixteen lines. If, on the contrary, he thinks that the latter part will not be quite as large he should take in, so that the whole may be embraced within fifteen lines. Most compositors space out in making even. It is considered allowable on dailies to space for four or five lines as thick as an em quadrat, and some offices allow for a line or two four thick spaces or an em and en. Good workmen will, however, prefer to borrow a word or two from the next man rather than do this.

End Leaves.—The blank fly-leaves at either end of a book.

End Papers.—The papers placed at each end of a volume and pasted down upon the boards. They should always be made; that is, the colored paper should be pasted to a white sheet.

Enderezar (Sp.).—To straighten up lines which have become crooked.

Endless Paper.—Paper in reels—not in sheets—used for printing on rotary machines, otherwise known as web presses. The rolls are from four to seven feet long, and weigh several hundred pounds each.

Engager (Fr.).—To hire.

Engine.—The machine by which the rags or other raw materials used in paper-making are reduced to pulp. See under PAPER-MAKING. "Engine of civilization," the printing-press.

Engine-Press.—A small press formerly made by S. P. Ruggles, in which the type was printed with the face downwards.

Engine-Sized Paper.—Paper made from pulp sized in the beating-engine, distinct from hand or tub sized, which is sized after the paper is otherwise completed. See PAPER.

England.—Printing did not begin in England until some time after the dispersion of the printers at Mentz in 1462. It was introduced there by William Caxton, a mercer (or dry-goods man, as we should call him), who had lived in the Low Countries for very many years. He began printing in the city of Westminster about the year 1476, having previously issued books on the Continent. His press was very industrious and produced works steadily up to the time of his death in 1491. Wynken de Worde and Richard Pynson, two of his workmen, each entered into business in the city of London after Caxton's death, but were preceded by Lettou and Machlinea, who began there in 1480. Other early printers were William Faques and Julian Notary. In 1480 Theodoric Rood of Cologne printed at Oxford, and during the same year an unknown workman, who is generally called the Schoolmaster of St. Albans, was a printer in the latter town. The art extended slowly in any district away from London. The other university town, Cambridge, began printing in 1521, and there was a press at York in 1509. Other early towns were Beverley, Tavistock, Southwark, Canterbury, Ipswich, Greenwich, Worcester, Norwich and Moulsey.

The art was not practiced without many restrictions. Pynson became king's printer in 1500, and was followed by Thomas Berthelet. In 1533 an act to regulate the importation and binding of books and prohibiting the sale of foreign books without license was passed. A little before this the printing of Bibles was forbidden, as an injury to the morals of the people was thereby effected by "children of iniquitie, blynded through extreame wickednesse." In 1535 the whole Bible in English was published by Coverdale, so that it is evident that this ordinance was not enforced. In the years which next followed many books were prohibited, and licenses were found necessary. As a consequence illicit printing became common. Whoever had anything to print against any existing abuses sought a printer in some place little likely to be suspected, and his work was there put in type. These printers moved from town to town and from house to house, being advised of movements against themselves by others of the same views in politics or religion as their own. They were the easier enabled to do this, as a hundred or two hundred pounds of type was sufficient for their uses; they had no extensive array of tools, and any carpenter, sufficiently directed, could make a press. In 1637, by a decree of the Star Chamber to put an end to such practices and to free publication otherwise, it was ordered that there should henceforth be no more than twenty printers, exclusive of those at the universities, and four letter-founders. This had been once before decreed. Archbishop Whitgift in 1585 had framed an enactment, passed by the same court, but both alike were habitually violated, and the number of printers kept increasing. If discovered, however, to be acting in contravention of the law they were treated with the utmost rigor. After these enactments were repealed others were passed, but there is none now which interferes with the liberty of printing. The construction of the English laws respecting treason, blasphemy and disorderly conduct was until about 1820 of extreme severity, as it now is with libel.

Day was the first who made much use of the Roman character, the original faces having been black-letter. In 1600 little black-letter was used except in ecclesiastical and legal books. Presses did not improve much until a century later. The first regular newspaper was issued in 1622, but no daily journal appeared until 1702. In Moxon's book, Mechanick Exercises, published in 1683, he says: "The number of founders or printers were grown very many, insomuch that, for the more easy management of typography, the operators had found it necessary to divide it into the several trades of the master printer, the letter cutter, the letter caster, the letter dresser, the compositor, the corrector, the pressman, the ink maker, besides several trades which they take into their assistance, as the smith, the joiner, &c." About the time Franklin went to London the art had become settled in its usages, which were much like those at present, except in regard to capitalizing, then much freer than now. Among the ornaments of the art in the years which followed were Caslon, the type-founder; Richardson, the novelist, who had a large establishment, and Baskerville, Bulmer, Nichols and Bowyer.

Stereotyping in the modern way began by the efforts of the Earl of Stanhope, who also first introduced the iron press. It was in London that the exertions of König to construct a power-press were successful, and there also composition rollers were first used. The general work of England has always been good, and although in particular lines that country is surpassed by France, Germany and America, her average is still high. There have been many eminent printers there since the beginning of this century.

Before 1750 no account was kept of the number of newspapers sold in England. The total was then about 25,000 a day, if all were considered daily. The population of the country might then have been 7,000,000. In 1760 there were sold about 30,000 daily, and in 1790 about 50,000. The circulation increased about one-half in the years between 1811 and 1832, although the population had not grown much more than 10 per cent. In the former year 75,000 copies were demanded, and in the latter 95,000. The largest provincial circulations in 1833 were the Leeds Mercury, 6,000 copies a week; the Liverpool Mercury, 3,400; the Manchester Times, 3,600; the Manchester Guardian, 3,600; and the Stamford Mercury, 5,200. There were only two newspapers in Birmingham, six in Bristol, ten in Liverpool, four in Sheffield, five in Manchester, and four in Leeds. Thirteen published fewer than 200 a week, and one published less than forty a week. There were then only 178 country newspapers in England, or less than the State of New York possessed at the same time, with one-sixth of the population. This may chiefly be ascribed to the extraordinarily heavy taxes upon advertisements and upon circulation.

In 1834 newspapers in London were sold by the publishers to newsmen. At that time the better class of daily papers sold single copies when asked for at fourteen or fifteen cents American money. The newsmen purchased the sevenpenny journals by quires of twenty-seven papers, paying therefor thirteen shillings, so that their gross profit on this number of papers was forty-four cents. The stamp duty was then fourpence, leaving the cost of production of the paper at six or seven cents, out of which must be taken the newsdealer's discount. It was estimated by McCulloch that the newspaper proprietor thus received about five cents for each copy. There seems to have been in 1832 ten dailies in London. The largest circulation was that of the Times, about 11,000 a day; the next the Morning Herald, with 7,400, and then followed the Morning Chronicle, Morning Advertiser, Morning Post, Public Ledger, Courier, Globe, Sun and Standard with less circulations, but exactly what they were cannot be told, as their returns are mixed up with others, except in the case of the Courier and Sun, which printed, respectively, about 3,000 and 2,500. On the principal journals the stamp duty paid on circulation was $290,000, $115,000 and $110,000. The advertisement duties on the Times were $75,000, and on the next journal in magnitude about half that sum. The receipts from that source are not known. The expense of the Parliamentary report was about $15,000 a year, ten reporters being required.

The total number of newspapers in England in 1824 was 166, of which thirty-one were in London and 135 in the provinces; in 1886 there were 1,634, of which 409 were in London and 1,225 in the provinces. The change in the quantity and quality of matter has also been very great. At the earlier date country newspapers were filled almost entirely with local news, but at the present day they have well-written editorials, foreign correspondence, an abundance of telegraphic news, literary matter, a London letter and a wealth of local information, generally, however, written in a very colorless style. They contain from four to eight times as much matter as they did fifty years ago. More than a score of the larger journals have private wires, and from fifty to sixty newspapers have full reports of all that is done in Parliament. Single weekly newspapers have been sold for $250,000. This is more than any weekly paper, not intended for circulation throughout the whole of the United States, would bring on this side of the water.

Newspapers do not constitute as large a part of the printing business in England as they do here. In nearly every town printing existed before a newspaper was thought of, and in the larger places, when journalism did begin, expenses were so great comparatively, and London overshadowed all other places so completely, that growth was slow. Until nearly sixty years ago there was a tax of fourpence on all newspapers, a duty of three shillings and sixpence on every advertisement, and threepence per pound weight. This necessitated a charge of sevenpence for newspapers and seven shillings for an advertisement, no matter how small. Few kinds of business could pay for advertisements at this rate, and the effect on circulation of the other two charges was that only families which could afford to keep a coach were rich enough to take in a daily paper. In 1836 the stamp duty was reduced from fourpence to a penny; the duty on advertisements was taken off in 1853, and in 1855 the penny stamp was removed. The last of the taxes, that of three halfpence per pound on paper, was removed in 1861. Since 1861 the English press has been completely free, although each newspaper must give the name of its printer in every number.

The growth of the English press since the abolition of the duties has been remarkable. In 1831, when the taxes were heaviest, the total yearly circulation of newspapers in the United Kingdom was 38,648,314, or a little over 123,477 a day. In 1864, three years after the last tax was taken away, the circulation amounted to 546,059,400, or 1,744,918 a day. The population of the country had increased only 30 per cent.

The quantity of printing which is done in England is very great. This is largely due to the fact that it is the principal seat of production of books for the entire English-speaking world, which comprises Great Britain and Ireland, Canada and the other British possessions in North America, Australia and New Zealand, the Cape Colony and many scattered islands and small countries, which, together with the United States, have 110,000,000 of persons to whom the English language is native, about twice the number of those who speak German, and more than twice the number of those who speak either French or Spanish, the other European languages most used. The English tongue is, too, the official language of many other countries which are subject to the British throne, and which, with those mentioned, constitute nearly one-fifth of the surface of the globe. It is the chief language of sailors, and the most adventurous sportsmen and travelers are those to whom it is a mother tongue. Another advantage enjoyed by English publishers is that English is read and spoken by a larger class of well-educated and rich men and men accustomed to buy books than any other language. In this respect Germany, which has a greater number of highly-educated men, cannot contrast with England, as the means of the book-buyers there are small. This explains the common appearance of German books generally. The conditions of life have also made novel writers numerous. Probably there are more persons who make an income of two hundred pounds a year and over from this source in England than in all the rest of the world together. Circulating libraries cause a sale to a certain amount of every interesting book. Mudie will take of an ordinary book of travels a hundred copies, but of a book like Stanley's latest a thousand or two. The libraries, and particularly the British Museum, assist in the preparation of learned or historical works by the fullness of their resources. The newspapers have a wide field for comment, as the interests of England extend over the whole globe. Labor is not costly, and thus works issued in the United Kingdom can be introduced here, paying a duty, and still be as cheap as our own.

More capital is employed in printing in Great Britain than in the United States, comparing establishment with establishment, as customers receive a more extensive credit. The larger houses are nearly all many years old, having been founded by the fathers or grandfathers of those now engaged in them. There are many offices which each employ several hundred hands, including women and boys, doing printing, binding and lithography, and several pass beyond a thousand. Much larger quantities of type are bought than in America, establishments sometimes having from fifty tons up to three or four hundred tons. As a consequence, less stereotyping and electrotyping are done than has been the practice here, the former, now abandoned by Americans except for newspapers, being executed in England chiefly by the paper process. Job-printing is distinctly inferior to that of America. There are forty or fifty firms of press-builders; but as a rule their machines are not so well or rigidly made as ours, and a marked inferiority is shown in cut-work. Hand-presses are largely employed, even in London offices. Paper is chiefly printed wet. England manufactures her own paper and her own ink. The high grades of black ink are better than are generally produced here. In wood-engraving, which was revived there and brought to a high state of perfection by Bewick and his successors, its rank is respectable, but the presswork is deficient. Steel or copperplate engraving is little called for, and process plates are not very well made. In bookbinding England must yield the palm of superiority to France, although she has many bibliopegic collectors. Workmen live very comfortably there, although wages, judging by the American standard, are very low. Their expenditures are based on a lower key. Journeymen compositors or pressmen receive in London about nine dollars a week, a price which sinks in country towns to four, four and a half or five dollars. Foremen in small offices in London will receive ten dollars; with thirty or forty hands, twelve dollars; with a hundred hands, fifteen dollars, and under exceptional circumstances twenty. This is as high as they can reach, except as managers, for which many printers have not the business qualifications. In small towns the printer frequently learns bookbinding also, and there may be a stationery store or circulating library attached, so that a boy at the end of his time may have a knowledge of all of these subjects. Boys are generally regularly indentured. Few women are employed as compositors.

There are two great societies of compositors—one in London and the other in the provinces. The secretary of the Provincial Typographical Society, Henry Slatter, lives at Manchester. His society covers the whole of England, except London. The secretary of the London Society of Compositors, with an office at No. 8 Raquet court, Fleet street, is Charles James Drummond. These societies are very conservatively managed and are much less likely to come into sudden collision with their employers than the American organizations. Besides these there are over a dozen unions of different kinds in London, each branch of work being represented.

The Printing and Allied Trades Association in London is a master printers' society, brought together in 1890. There is no corresponding society elsewhere. The British Typographia is a society formed to study the methods of printing and how to do good work, and its membership extends over the entire kingdom. It was founded in 1887 or 1888. It embraces many employers as well as journeymen. See also under GREAT BRITAIN, LONDON and STATISTICS.

English.—A large size of type, the next above pica and next smaller than Columbian. There are many kinds of display type cast to it, but it is little used as a text type except in children's books, in Bibles and bills before law-making bodies. Five lines make an inch. It is double the size of minion, and is known as fourteen points in the point system. It is called Saint Augustin in French, Mittel in German, mediaan in Dutch, and silvio in Italian.

This line is set in English.

English Face.—An old term for Old English or black-letter.

English Language.—The language chiefly spoken in the British Islands and in the United States of America. It belongs to the Teutonic family, and is most closely allied to the Dutch, as spoken in Holland, of all the languages with a considerable literature. Its subfamily consists of the Dutch, Belgic, Frisian and Platt-Deutsch tongues, as contrasted with the High German on the one hand and Swedish, Danish and Icelandic on the other. It is not the indigenous language of Britain, but first appeared there about the year 450, having previously been spoken at some places on the continent, near the southern boundary of Denmark and the northern boundary of Holland. As the invaders drove out the Celts, who had previously occupied the whole of England, the new language, which has commonly been called Anglo-Saxon, took its place. Much was written in it, and its remains still have a great deal that is valuable to the student of grammar, of history and of manners, but little to attract those persons whose whole idea of literature is something which will interest. The Danes conquered a portion of England afterwards, and many words from their language are still to be found in the dialects of the North. In 1066 William the Conqueror invaded England and made it subject. French, as spoken in Normandy, then became the language of law, politics and high life, and Old English began to disintegrate. It gradually lost its grammar, which much resembled that of High German of the present day. There were four cases and three genders, the latter not depending upon nature, but being arbitrary. By 1100 the language was somewhat simplified, by 1200 it was abandoned as a literary tongue, and in 1300 the speech had assumed much of its present form, writers again beginning its use. Chaucer, Wyckliffe and Sir John Mandeville were the earliest considerable writers. Many words were borrowed from the French, as later they came in from the Latin, and still later from the Greek. The translations of the Bible have had a great part in the settlement of the tongue, and the high authority of Shakespeare, who died in 1616, has preserved the usage of his age to a great extent. Very little now read in English is older than Shakespeare, and only one play of any early dramatist, except the Bard of Avon, is now ever put on the stage, the New Way to Pay Old Debts, by Massinger, being the exception. Spenser and Chaucer are very little read, and the minor authors still less. English grew more polished and more flexible under Pope and Dryden, whose prose may be regarded as among the very best in English. The elaborate sentences, with their involutions, of Milton and Jeremy Taylor never took root, and even the balanced phrases of Johnson left no followers. Addison and Swift set the key for the English of to-day. There is, however, to a well-trained ear a slight difference between what was written in 1800 and now, and more between 1750 and 1892. Some expressions have gone out of use and others have come in. In the last century it was said that a house was a-building, but most persons to-day would say it was being built. Others who desired to speak grammatically would say the house is building; but that would imply an object, and objectors might ask what particular thing the house was building. Many new words have been brought in and there are many added senses.

An enumeration of the words which would be understood by every fairly-educated man, excluding strange ones, such as abacus, epidermal and mariput and the like, but counting a word only once, no matter in how many forms it may occur, shows only about ten thousand. Allowing each variation to be a different word, Johnson in his first edition had between thirty and forty thousand; but subsequent lexicographers have increased the list until there are now enumerated over one hundred and fifty thousand. It is probable the New English Dictionary will bring the list up to two hundred thousand. Special vocabularies are rapidly increasing. Each calling or science must have distinctive words. This Dictionary has several hundred never before defined and several thousand not in the first Webster. The first great part of the language is the Old English or Anglo-Saxon. All the most necessary words are derived from it, as water, milk, bread, horse, sea and sun. So are the prepositions and conjunctions and the irregular verbs. The words are not so numerous as those from French and Latin, but are much more frequently used. Thus in five verses of St. John seventy words are Saxon and two are derived from other sources; of seventy-nine words in Addison twelve are from other sources; and of eighty-nine in Milton sixteen are foreign. Even Dr. Johnson, in one passage, has sixty Saxon and twenty-one foreign words. Sharon Turner gives two extracts, one to show how few foreign words are necessary, and the other how many can be introduced, those from foreign sources being in Italic:

"And they made ready the *present* against *Joseph* came at noon; for they heard that they should eat bread there. And when *Joseph* came home, they brought him the *present* which was in their hand into the house, and bowed themselves to him to the earth. And he asked them of their welfare, and said, Is your father well, the old man of whom ye spake? Is he yet alive? And they answered, Thy *servant* our father is in good health, he is yet alive. And they bowed down their heads, and made *obeisance*. And he lifted up his eyes, and saw his brother *Benjamin*, his mother's son, and said, Is this your younger brother, of whom ye spake unto me? And he said, God be *gracious* unto thee, my son."—*Genesis*, xliii, 25–29.

"Of *genius*, that *power* which *constitutes* a *poet*; that *quality* without which *judgment* is cold and knowledge is *inert*; that *energy* which *collects*, *combines*, *amplifies*, and *animates*; the *superiority* must, with some *hesitation*, be *allowed* to Dryden. It is not to be *inferred* that of this *poetical vigor Pope* had only a little, because Dryden had more; for every other writer since Milton must give place to *Pope*; and even of Dryden it must be said that, if he has brighter *paragraphs*, he has not better *poems*."—*Johnson*.

Next to the Saxon in frequency is the French. This has been borrowed from the old Norman French, as well as the more modern tongue of Racine and Voltaire. French has Latin as a root, but took many words from other sources. Long words from Latin were generally cut down, so we often have these in both forms, as in mère, derived from mater. This exists in English as mare, a female horse, and maternal, motherly. Many Latin words which come to us are not in literary French, and the freedom with which Greek could be compounded and then used to represent ideas has caused many thousand technical words to be added from this source. A recent example is agnostic, where a privative is prefixed to a word which signifies to know. Many Hebrew words are used in theology, and nouns to describe particular things have been borrowed from the whole world, as algebra, assassin, potato and caviare. It is probable that this tendency will increase.

English, while having a nice discrimination in the use of words, is almost entirely without grammar. Ideas are interpreted by position. Usually speaking, words follow a certain order in the sentence, the writer or speaker not attempting to invert the phrase in order to give more prominence to a certain idea. In languages with a complicated grammar the leading idea is often shown by having the word which relates to it placed first. It is thus emphasized. Formerly this grammar, like the German, was difficult. The Lord's Prayer is here given in the oldest form, with an interlinear translation:

Fæder úre, thu the eart on heofenum, si thin nama
Father our, thou that art in heaven, be thy name
gehalgod; to-becume thin ríce. Geweorthe thin
hallowed; become (let come) thy kingdom. Happen thy
willa on eorthan, swa swa on heofenum. Urne
will on earth so so (as) in heaven. Our
dæghwamlican hlaf syle us to-daeg. And forgyf ús úre
daily loaf give us to-day. And forgive us our
gyltas, swa swa we forgifath úrum gyltendum. And
guilts, so as we forgive our debtors. And
ne gelǽede thu us on costnunge, ac alys us of yfle:
not lead thou us into temptation, but deliver us from evil:
Sothlice.
So be it.

The tendency of to-day is to cast sentences in the simplest and most direct forms, using only enough involution or modification to prevent monotony. In this particular our language is like French. Words are used by writers generally only in the senses made certain by their employment by good authors. This is not necessary, as English has been modified in times past by authors and speakers, and must be still further in many respects in the future. Knowledge is becoming greater;

the arts and sciences are subdivided, and those who teach or write on them must employ or invent new words which shall express their ideas more definitely than was once necessary. Thus the whole electrical phraseology, with the exception of one or two words, has been coined within the present generation; chemistry and geology have been much enlarged, and military affairs have needed many additional words. Machinery has a vast vocabulary, continually enlarging. But the speech of common life has also many new words, owing to new foods and dishes, new amusements or new adornments. Old words have been revived, as kettledrum. The printer or proofreader, therefore, who is charged with responsibility has a difficult task before him in attempting to reduce to type the copy furnished to him. The medical vocabulary differs from that of law, and each of them from that of the church. Some expressions are ridiculous, and must be amended, while others, although infrequent, cannot be touched. The proof-reader or compositor who desires to obtain a clear knowledge of English must study it in the works of the best authors. Among them must be mentioned the Bible, authorized edition, although having many antiquated expressions; the Book of Common Prayer, also with many ancient uses of words; Shakespeare, although perverted by the carelessness of his original publishers and the conjectures of subsequent editors, and using language with a freedom we cannot now imitate; Milton, whose writings contain many inversions and half-Englished words; Pope, Dryden, Swift, Addison and Steele. In this century those most distinguished for their clearness, beauty and simplicity of language are Irving and Hawthorne on this side of the water, and Thackeray and Cardinal Newman on the other side. The last two have carried English to its highest pitch. There are, however, many colloquialisms in Thackeray. Macaulay is too antithetical for imitation. Dickens and Sir Walter Scott are not good examples of mere style, as both have many slovenly expressions, and the former is frequently affected. Scott has many turns of language which belong beyond the Tweed. A student, however, who is on his guard against faults in style can and should read all of these and many more. Defoe, Fielding, Dr. Johnson, Hallam, Carlyle, Mackintosh and many other novelists, historians and critics are necessary. Among those living at the present day Tennyson has the highest rank in poetry as to form.

English will soon be the universal language. Spoken by two great nations, by the colonists in two vast countries, and in many other places, it is the tongue of the adventurous, the learned and the rich. There are many new lands yet to be settled in which it will predominate. It is at present spoken by about 110,000,000 persons. In the reign of King Edward III. it was used by about 3,000,000, and at the beginning of this century by 20,000,000. Before the year 2000 it may reasonably be expected that 350,000,000 persons will employ it in their daily conversation. Russian, Spanish, French and Italian cannot then expect to be spoken by more than twice as many as now, and English will become, what Latin once was, and what Volapük in our day has essayed to be, the universal language, or that with which the traveler, the trader and the scholar can pass everywhere and unlock the stores of all knowledge.

Engraving.—The art of representing, by means of lines or points produced on a wooden or metallic substance by cutting or corrosion, the figures, lights and shades of objects in order to multiply them by means of printing. The artist is to the engraver what the author is to the translator. He cannot make a perfectly servile copy, for the substance on which he works forbids, and it is necessary that he shall also have an artist's perceptions as well as a knowledge of drawing. He is obliged, by the use of black and white lines, to convey to the public the ideas of the painter or draughtsman. That may be in great masses, or in broken bits, or in colors; the engraver has only one way of showing them, which is by the use of black and white lines. However varied the hues, all appear as black in the reproduction.

There are two main schools of engraving, steel or copper and wood. In the latter the part which is to show projects above the surface of the remainder of the block, that which is not to print at all being cut away, while in steel-engraving the lines are cut into the plate, and they alone print. From the nature of the case the latter must be the most delicate, as it is easier to cut a line into a block than to cut away the part around the line and leave that in relief. An extremely fine line in wood-engraving soon gets broken on the press. Engraving is divided into three branches:

I.—Steel (or copperplate) engraving:
  1. Line.
  2. Stipple.
  3. Mezzotint.
  4. Etching.
  5. Aquatint.
II.—Wood-engraving:
  1. Wood-engraving, properly so called.
  2. Process engraving.
III.—Lithography.

See under each of these headings. Process engraving cannot strictly be called engraving, as it depends upon the action of light and chemicals, and is touched by no tool except possibly to clear out large vacant spaces. In much there is not even a drawing. Neither can lithography properly be called engraving, as the stone is not cut into, except in some cases sufficiently to allow the paper to touch it without danger of smutting. It is really a chemical reproduction of a drawing.

Engrossing Hand.—A stiff and formal hand engraved by Cottrell about 1768 for a law-printer. It is a script, in two-line English.

Enlever (Fr.).—To take away.

Ennis, Richard, a printer of St. Louis, was born in Kilkenny, Ireland, on December 12, 1833. His parents removed to Montreal, Canada, when he was a child, and he there learned his trade. He went to St. Louis as a young man, being employed in the Democrat job office. In 1857 he bought a half interest in the Telegraph of Alton, Ill., but two years later returned to St. Louis, where he has since been engaged as an employing printer and stationer. The most remarkable book published by him was the Laws of the Cherokee Nation, in English and Cherokee. Some of the characters and accents had to be invented, and special punches and matrixes were prepared. The business of his house is now very extensive. It is known as the R. & T. A. Ennis Stationery Company. Mr. Ennis has written much on printing, and has been a contributor to many newspapers. He is an active member of the Typothetæ of his city, and was selected by his delegation at the banquet in Chicago in 1887 as their representative, as he is an eloquent and effective speaker.

RICHARD ENNIS.

Enschedé.—A noted family of Dutch type-founders. The first who embarked in this occupation was Isaac Enschedé, born in 1681 and dying in 1761. He began business in 1703. His son, Johannes Enschedé, who was born five years later, united with his other business the Amsterdam Courant. He died in 1760. The late head of the house was Jean Enschedé, who died in 1866 at the age of eighty-two. This family still carries on type-founding in Haarlem. His successors published in 1867 a specimen-book containing their ancient characters and giving a history of their house. Many of the punches of Christoffel van Dijck are still in their possession.

Entourer (Fr.).—To surround, as with a border.

Entreflet (Fr.).—A rule.

Envelope.—A paper cover to a letter. This was its original use, but it is now employed for everything for which a cover is needed. It differs from a wrapper by having its ends closed, while in a wrapper they are open. Common use of envelopes is comparatively recent, yet there are occasional instances of their employment for more than two hundred years. In the English State Paper Office there is one of the date of 1696, very much like those at present, and in Gil Blas, published in 1715, one of the characters takes a couple of letters and puts them in envelopes. After the introduction of penny postage in England, on January 10, 1840, they became common in that country, and in America some five years later. In 1851 or 1852, when Congress made a considerable reduction in postage, correspondence became in consequence much more common, and envelopes soon were in great demand.

The earliest manufacturer of envelopes in New York was an Englishman named Dangerfield, who began about 1846. By 1850 the use of this article had become common enough for several other firms to embark in the business; but machinery was not employed until just before the war. Prior to that time the blanks were cut out by ordinary chisels and pasted and folded by hand. Only two or three thousand could be made in a day by one person. Machines were invented in England in 1845 by Warren de la Rue and Edwin Hill, and many changes and improvements were made upon them for the next ten years.

The American machines, however, were not borrowed from the English. There were several problems connected with their manufacture, each of which was solved only after considerable time. Envelopes are cut out by stamps in a screw press, several hundreds at once. The design is of the extreme size of the envelope when unfolded, and consists of the front, back flap, two side flaps and closing flap. With many forms there is much waste in cutting, as a rectangular piece of paper will not answer for the blank. Economy of paper must be studied. The three lower flaps must be so gummed that when they are folded together they will make a neat union, and the top flap must also be gummed, but left open, so that the gum may dry before being turned down. To effect these various purposes many contrivances have been made, perhaps accomplishing one object well, and from a union of the various good points the machine of the present day has been evolved, which will take off the top sheet of a pile of blanks arranged on a feed-board before it, fold it, gum it, and pass it out to the delivery. When it is fed by hand the greatest speed of a girl has been 35,000 a day, but where self-feeding is applied the result may mount up to 55,000 a day. The earliest patent for American machinery in the making of envelopes was that of Ezra Coleman of Philadelphia, granted in 1853. There has been much litigation connected with envelope machinery patents.

Envelopes generally are of four kinds—drug, pay, commercial and official. The last are large, used by public officials, by corporations and by lawyers. Commercial envelopes are those generally employed; pay envelopes are a size still smaller, used more than for any other purpose for payments in manufacturing and commercial establishments; and drug envelopes are needed by apothecaries in putting up their prescriptions. There are besides commonly made, although not in quantities equal to the other varieties, coin, portfolio, photograph, insurance policy, clearing-house, birthday, money express, glove, tooth-brush, comb, theatre ticket, catalogue and pamphlet, Christmas, Easter, express, scarf and valentine card envelopes. Paper for them is calculated generally to a size 22½ by 30 inches, although many manufacturers use larger sizes for convenience in their machines. The papers vary on the above stated size from twenty-two to seventy-five pounds a ream, and are of many qualities. Paper for envelopes should be rather tough, as the folds made are very sharp. The kinds most used are the commercial, of which there are six sizes; there are six of the official sizes, three of pay and four of drug. The smallest size regularly kept on hand is 1⅜ by 2¾ inches, and the largest is 8 by 12¼. Some envelopes are cloth lined to give greater security, and some are partially lined. The usual length is nearly double the width, but square, document and baronial envelopes are made only a little longer than their width. Envelopes for wedding and society invitations, &c., are made out of paper of high quality.

For low-grade envelopes the mucilage is made from gum senegal, but starch, dextrine and a hundred other substances are used. For a high grade of envelopes gum arabic is employed. Sometimes they are kept ungummed. They are usually packed in boxes containing 250 or 500 envelopes. They are known as low cut when the flaps at the back are cut down as much as possible, still giving an opportunity for closing; government envelopes, in which the closing flap has much more to adhere to, and high cut when the top of the higher flaps runs straight across, or nearly so. Tinted faces are made, and there are embossed, gilded and figured envelopes.

With the successive improvements in manufacture the consumption of envelopes has increased and their price has lessened. In 1839 letters in Great Britain and Ireland were not generally inclosed in envelopes; in 1841 one-half were inclosed, and in 1850 one hundred out of one hundred and twelve were inclosed. In the United States it may be said that in 1845 few letters were in envelopes; in 1852 nearly all were. It is now supposed that the consumption of envelopes in this country is from eight to ten millions a day, or not far from three thousand millions a year, of which two hundred millions are government stamped envelopes. These envelopes the government sells at the very lowest cost, and in addition prints a return request free of charge, when a sufficient number are ordered, thus inflicting an injury upon printers and envelope makers, who would otherwise have this work to do, at prices which to them would be remunerative. Much of the use of envelopes is in commerce, as coverings of this kind are found to be very convenient and neat. Very large sizes, even 20 by 30 inches, are sometimes thus manufactured. The printing of envelopes is not among the work most desired in a printing-office, as if the flap is folded there is one thickness more of paper on a part of the lines than on the rest, and if the flap is opened out more time must be put upon the job. The envelope being of two thicknesses together does not even then print as well as other jobs. The price for envelopes is always low, as envelope makers generally endeavor to print large orders themselves, and will frequently do the printing and furnish the envelope for the same rate that they will sell the unprinted envelope to the printer. To secure greater profits the envelope manufacturers at various times formed combinations to regulate the prices and qualities of goods. Such combinations regularly fell through, the last, formed in 1887, having by far the strongest organization, but going to pieces finally. The chief seats of the manufacture are in New York, Philadelphia, Hartford, Rockville, Springfield, Holyoke and Worcester. There are about thirty large firms engaged in the business, besides a number of smaller manufacturers.

Ephrata.—A town in the interior of Pennsylvania where printing was carried on for many years before the Revolution. It had the second German press established in Pennsylvania, Sauer at Germantown having begun there somewhat earlier. A great number of publications were issued, among others the largest work of America in colonial times, the Blutige Schau-Platz, or Book of

Martyrs. This extended to 1,514 pages in folio. The press lasted from 1745 to 1819 or 1820.

The society which began these publications and which owned the press was a branch of the Seventh Day Baptist Church, then and now known as Dunkards. They were Germans, and came to Pennsylvania in the second quarter of the eighteenth century. The sect began in 1694, their views being that extreme plainness should be followed in dress, that baptism was necessary for a Christian, that the true day for the observance of the Sabbath was Saturday, and that it was wrong to bear arms or to take human life. From the last dogma they were entitled by themselves the Defenseless Christians. The settlement, which was formed on the Cocalico Creek, in Lancaster County, was known as Ephrata. Its leader was Conrad Beisel.

Finding that it was necessary to instruct his people in religious truths, Beisel procured a press, type and paper and began issuing books in German. Some were German works reprinted, others were translated from the Dutch, and some were prepared in America, and were reprinted in Germany. Large editions of one or two were published, and their productions are still treasured among the Dunkards and other German-speaking people of Pennsylvania, Ohio and Illinois. This press printed the Declaration of Independence in five languages, and while the Congress of the Confederation sat at Lancaster it printed the Continental money. Its issues are highly prized by collectors.

Epigrafe (Ital.).—An epigraph. This is a quotation on a title-page or at the head of a chapter, set in much smaller type than the body and pushed forward to the end of the line. It may be only a line, or it may be a dozen. This practice is unknown in England, but is somewhat followed in France.

Epitaph.—An inscription on a tomb in honor of the dead; also lines commemorative of an individual. Many quaint epitaphs were devised by printers in the seventeenth and eighteenth centuries. Franklin in his youth prepared an epitaph for himself in imitation of one in an old book, but it was not used. Instead of it only the words "Benjamin and Deborah Franklin, 1790," were inscribed upon his tomb. Franklin's early epitaph read thus:

THE BODY
OF
BENJAMIN FRANKLIN,
PRINTER,
(Like the cover of an old book, its contents torn out
and stript of its lettering and gilding),
Lies here, food for worms;
Yet the work itself shall not be lost,
For it will (as he believed) appear once more
In a new and more beautiful edition,
Corrected and amended by
THE AUTHOR.

Baskerville, who was a Deist, was buried upright in his own garden. Upon his tomb was placed the following inscription:

STRANGER!

Beneath this tomb, in unconsecrated ground,
A friend to the liberties of mankind directed
His body to be inurned.

May the example contribute to emancipate thy
Mind from the idle fears of superstition
And the wicked arts of priesthood.

Epitome.—A compendium or abridgment.

Éponge (Fr.).—Sponge.

Épreuve (Fr.).—Proof; épreuve d'artiste, artist's proof.

Equal Mark.—A sign used in arithmetic, thus: =. It is not the parallel mark laid on its side.

Equivalent Weights of Paper.—The difference in weight between two sizes to compensate for a larger or smaller sheet. Thus a sheet 22 by 32 inches might have been used to print the first edition of a book. A different shape might be required for a second edition, more matter being added and the type reset. The new sheet is 28 by 42, but of equivalent weight to the former, which was forty pounds. What weight shall be used? The answer is obtained by finding the number of square inches in each size, multiplying the larger number by forty, the number of pounds, and dividing the result by the area of the smaller sheet. Thus:

$$22 \times 32 : 28 \times 42 :: 40 : 66\tfrac{3}{4}.$$

The area of the smaller sheet is 704 square inches, and of the larger 1,176 square inches. Therefore, 40 pounds to the smaller size will be equivalent to $66\frac{3}{4}$ pounds in the larger one. Tables have been constructed to show these differences, and a machine for weighing a sheet and showing by an index the proper equivalent in another size is also known.

Erasure.—An effacement or obliteration. The act of rubbing or scraping out letters or characters written, engraved or printed. This word and several others which have the same general meaning are thus distinguished from each other by the Commissioners of the Public Records of Great Britain. Cancellation, derived from cancella, a lattice, denotes the drawing of a pen several times obliquely across a passage, first from right to left, and then from left to right, in the manner of lattice-work. Erasure, from the Latin eradere, to scrape out, implies the removal of a faulty portion by the application of a knife. Expunging or expunction, both derivations from the same verb, expungere, to prick or dot out, was a method by which the clerk neatly expressed that a word or part of a word was to be omitted, as "sententcece." By leaving out the underdotted or expuncted letters the amended word will be sentence. Obliteration, from obliteratio, meaning the act of blotting out, is the method of completely covering the error with ink so that not a letter can be seen. Elision, from elidere, to strike or dash out, is the act of striking out the erroneous matter by a simple dash of the pen. Deletion, from delere, to wipe out, is the wiping away the ink while it is yet wet and then continuing the writing over the space which had been in the first instance occupied by the error.

Errata.—A list of those errors in a book which are of sufficient importance to be called to the attention of the reader. In the older books this was usually done in a page at the end of the work, but more lately a slip just large enough to contain the corrections was pasted in by the bookbinder. There are now three or four locations for this emendation. One is before the title-page; another before the preface; a third after the preface and before the body of the book, and a fourth at the end of the work. From the practice of stereotyping and electrotyping, which enables an alteration of the plate to be made for subsequent editions, and from the disinclination of authors and publishers thus to point out their shortcomings, the practice of inserting errata has become much less frequent than in the last century. Simple typographical errors ought not thus to be noted, nor errors which any reader with intelligence can correct; but such a table should be reserved for positive errors, as, "for Henry VII. read Henry VIII.," "for Austria read Australia," or "for sulphite read sulphate." Upon this subject Crapelet says that the number of skilled correctors in any country has always been small. To supplement this defect there was established in Spain in early times a private police for the correction of books. Printers could not put on sale a volume unless it had been submitted to the examination of a censor charged especially to compare the printing with the manuscript, solely for the purpose of marking the typographical errors. It is, however, probable that this officer helped to prevent the slipping in of doubtful passages. The typographer was obliged to print a leaf of errata, which was placed in the beginning of the volume, with the attestation signed by the censor that the book was faithfully printed, with the exception of the faults indicated.

Errata-Corrige (Ital.).—The table of errors at the end of a book.

Erratum.—The singular of errata.

Errors, Typographical.—Every kind of deviation from correctness which is found in type before being printed or in the sheet after the impression has been made. These errors are of many classes. Literal errors are those where a letter is wrongly substituted for another, or where it is upside down, turned on its side, a wrong font or defective. These constitute the majority of errors, but there are many other kinds. The compositor mistakes one word for another, as vanity for variety; he omits a letter or letters, a word or words; he doubles characters or words, makes wrong divisions, spaces badly, leaves out leads, spells wrongly and commits many other kinds of error. Each type can be placed in the stick in eight different ways, and every letter is battered in the course of time. The copy which is the easiest to set is that on which the best proof can be made, which is reprint in good-sized type, upon common subjects. As the copy gets worse the proof gets worse with it. To avoid errors of this sort as much as possible well-trained compositors refrain from talking while they are setting type, and they also keep their minds free from any other subject than their work. Although some men can talk while setting good copy and have no errors of consequence to reproach themselves with, most men cannot on any copy, and very few can do it on complicated work, filled with Italic, foreign words, figures and small capitals. It is a good plan for most compositors to read each line as soon as it is set, and nearly all should read their stickfuls.

It does not appear that the earliest printers had any method of correcting errors before the form was on the press. It is recorded that Caxton read over his books after the impression was complete, marked in red ink on one copy what errors he could find, and employed another man to copy these marks into all of the other volumes. The learned correctors of the first two centuries of printing were not proof-readers in our sense; they were rather what we should term office editors. Their labors were not chiefly to see that the proof corresponded to the copy, but that the printed page was correct in its Latinity, that the words were there, and that the sense was right. They cared little about orthography, bad letters or purely printer's errors, and when the text seemed to them wrong they consulted fresh authorities or altered it on their own responsibility. Good proofs, in the modern sense, were not possible until professional readers were employed—men who had first a printer's education, and then spent their whole lives in the correction of proof. The orthography of English, which for the past century has undergone little change, was very fluctuating until after the publication of Johnson's Dictionary, and capitals, which have been used with considerable regularity for the past eighty years, were previously used on the hit or miss plan. The approach to regularity, so far as we have it, may be attributed to the growth of a class of professional proof-readers, and it is to them that we owe the correctness of modern printing.

More errors have been found in the Bible than in any other one work. All other books have some one whose interest it is to see that they are correct, and who examines each work as it comes from the press for that purpose. But for many generations it was frequently the case that Bibles were brought out stealthily, from fear of governmental interference, and at other times it was impossible for the buyer to examine the book before he took it, even had he sufficient knowledge. They were frequently printed from imperfect texts, and were often modified to meet the views of those who published them. The story is related that a certain woman in Germany, who was the wife of a printer, and had become disgusted with the continual assertions of the superiority of man over woman which she had heard, hurried into the composing-room while her husband was at supper and altered a sentence in the Bible, which he was printing, so that it read Narr instead of Herr, thus making the verse read "And he shall be thy fool" instead of "and he shall be thy lord." The word not was omitted by Barker, the king's printer in England in 1632, in printing the seventh commandment, so that it read: "Thou shalt commit adultery." He was fined £3,000 on this account.

The most celebrated error in an American paper was one committed in the New York Times during the French and Austrian war. Two of the editorials were completely mixed up, making the greatest nonsense imaginable. The mistake was discovered by the proof-reader, but he had been sternly informed that he was to make no alterations in the copy of this particular writer, and the "elbows of the Mincio" and the "sympathies of youth" appeared in print in ridiculous juxtaposition. A compositor on the Tribune set Richard the Third for William H. Seward, and another translated Mr. Rhett, a noted Southern leader, into the South. Twice within fifty years some compositor upon one of the great London dailies has altered the name of one of the Queen's palaces into an obscene word. In one case all of the night force was discharged on this account.

Faults are of all kinds, and sometimes are so plain that it passes belief how they could have escaped any reader. A newspaper in Scranton, Pa., a few years ago printed an obituary in which it said that "the remains were opened" instead of "the services were opened." The Catechism of Abbé Fleury, edition of 1826, says: "Selfishness is the love of ourselves which turns us aside from loving our Creator, and from this come all the sins which lead to eternal life."

Dictionaries and other works of learning are not free from errors. In a copy of Webster's Dictionary, edition of 1860, which was formerly in the office of a daily newspaper in New York, there were several hundred marks of correction; the hyphenizing, spelling and division of one place were not preserved in another. The last edition of the Encyclopædia Britannica has a number of typographical errors.

The first folio of Shakespeare, and indeed all of the early editions of his works, including the quartos, swarm with errors. The copy was undoubtedly very badly prepared, much being from imperfect prompter's copies, and the 1623 edition does not appear to have been read by any one in order to make the sense complete. Had this been done the vast host of Shakespearian critics and students who have published books upon him or his works would have had little to do.

Escalera (Sp.).—In composing, to have the spacing come in the form of stairs; bad spacing of the lines of a title-page.

Escocesa (Sp.).—Scotch (name given to script letter in Spain).

Escritura (Sp.).—Script; escritura inglesa, English script; escritura comercial, commercial script; faces so called.

Escuadra (Sp.).—A square; buena escuadra, well squared; mala escuadra, out of square.

Espaces (Fr.).—Spaces; espacer, to space.

Espaciadión or **Espaciado** (Sp.).—Spacing.

Espaciar (Sp.).—To space.

Espacio (Sp.).—Space.

Espacio de Imprimir (Sp.).—Space rule.

Esportillos (Sp.).—Drawers for extra quadrats, reglets, &c.

Esquela (Sp.).—Billet or note circular.

Esqueleto (Sp.).—Skeleton (style of type with very light face).

Esquinago (Sp.).—Corner (of page); corner-piece.

Essuyage (Fr.).—Wiping (of a plate or stone).

Establishment.—A workman on weekly wages in England is said to be on the establishment. In the United States he is called a weekly hand or office hand. Establishment is generally contracted to stab.

Estado (Sp.).—Table (rule and figure work).

Estampe (Fr.).—A print; an impression from an engraving.

Estante (Sp.).—Stand, rack, frame.

Estereotipia (Sp.).—Stereotypy.

Estienne.—The name of a family of printers, otherwise known as Étienne or Stephens, the French word Étienne being translated into the Latin as Stephanus. The earliest of this family, Henry, was born in Paris about 1460 and died in 1520. He was therefore contemporary with the rise of the art. He was a boy of ten years of age when Gering, Friburger and Crantz established a printing-office at the Sorbonne. In 1502, braving disinheritance and derogating from his position in the nobility, Estienne began his labors as a printer. He published mathematical and theological works, being distinguished for his accuracy. He had three sons, François, Robert and Charles. Robert was a man of great learning. In his house Latin was the ordinary language of conversation, even among women and children. Some four hundred works came from his press, many of them very large. He printed many editions of the Bible, but the chief work with which his name is associated is his Dictionary of the Latin Language, a book on which immense labor was spent and which has formed the foundation of all subsequent dictionaries of that tongue. As he inclined to the Protestant faith he was put under suspicion by the officials of the Sorbonne, and after attempting for many years to publish as he saw fit he felt compelled to flee from France and take up his residence in Geneva, in Switzerland. The king, who had been his protector, had died. The credit of dividing the Bible into verses is generally given to him, although this had partially been done before.

Henry, the son of Robert, was also a very learned man, knowing Latin and Greek thoroughly. He printed in Paris and Geneva, and after his father's death succeeded to his business and added to the splendor of the name by the great works which he issued. Among these was a dictionary of Greek. In his latter years he suffered much from straitened means, and journeyed from city to city, printing works wherever he happened to be, and projecting others for which he gathered the materials. There were other members of the family who attained distinction, the press lasting altogether about one hundred and seventy-five years. The name is justly considered one of the most honorable in the history of typography.

Estimate.—An estimate is the price given to a customer for some work which he wishes to have done. It may be for a dollar or two, or it may be for a hundred thousand dollars. It is not well to estimate against an indiscriminate crowd of printers, for there are always some who from lack of knowledge of their business and others who from errors in calculation will make prices from 15 to 25 per cent. below what they should be; but if it is determined to estimate it should be done with coolness and deliberation. If done in a hurry, with the customer waiting, there may very possibly be an error likely to be very injurious. If the printer makes the error in his own favor the customer imagines that there is an attempt to cheat him; if the price is too low the very object of carrying on business is defeated. No living can be made out of it. If the estimate covers ten dollars or more and involves any computation, it is well to send the applicant away and say that the figures will be sent to him.

Many printers decline to give estimates at all on small jobs, saying that they will charge no more than the matter is worth, and good customers will not be disposed to insist on knowing the price beforehand. Having received the copy and been told the size, the number of copies, and what the general appearance of the job is to be, the first question to determine is as to the cost.

The expenses are five, viz., composition, presswork, paper, folding and stitching and delivery. Each of these is subdivided. There are three classes of work in the composition-room—typesetting, proof-reading and making-up. In the pressroom there are two, presswork and ink. Paper has in addition to its cost at the warehouse the handling and cutting up. In the folding and stitching are included the hanging up of sheets to dry, the standing press, the folding, gathering and collating and stitching, and at the end there is the sending home. There is a waste on the paper and on the ink. More of each of these must be provided than the number to be printed calls for. The delivery in a large establishment costs from one to three thousand dollars a year, and there is a loss of 1½ to 2 per cent. in many well-conducted establishments on bad accounts.

It is evident, therefore, that the charges to be made must be a great deal more than the expenses which, under the most favorable circumstances, will barely cover the cost. Much more must be put down. The amount of this charge must be determined by taking all of the various elements into consideration, such as rent, fire, insurance, waste, bad debts, clerk hire and delivery, and after an equitable division of these is made a part should be placed on every job or book which is done, according to its magnitude and the time and trouble which it has given.

It would be manifestly wrong for the proprietor of an establishment where only newspapers are done to charge as much per thousand ems for rent as the owner of a book-room would do. In the one case twenty compositors, doing 45,000 ems each per week, are accommodated in a room 20 by 50 feet, for which $500 a year is paid; in the other case twenty men are generally working on books, averaging 30,000 ems a week, in a room 25 by 70 feet, costing $900 per annum. The rent per thousand ems in the one case is a fraction over a cent; in the other three cents; but such a newspaper office would take no more than $5,000 to fit it up, while the book-room would need much more than $10,000. The proof-reading would cost $10 more a week on books than on newspapers, while under favorable circumstances one man could make up all the matter in the latter, and under some circumstances could do it in two days, while in the former two men would be constantly required at the stone. There is, therefore, a vast disproportion between different work bearing the same name, which should be carefully considered in making an estimate.

The plan recommended by Hansard is to place at least 87½ per cent. more on composition of bookwork than is paid to the compositor. First, the compositor is to be paid; then the make-up must come, never less than three cents, perhaps five cents, per thousand. The reading is worth, on the commonest reprint, six cents, and on good work twice that. It occasionally rises to more than three times the figure just given. For instance, the Atlantic Monthly could not be well read for less than eighteen cents a thousand. Added to these is superintendence, with all of the expenses for rent, fire, water, gas and the like. It will be found that one-half added for labor and one-quarter for dead expenses will no more than cover the expense of carrying on the place. Profit must be considered also. These details will not be pursued any further here, as under each appropriate head they will be followed out more closely, but they are only given to show the necessity of careful bookkeeping and a thorough knowledge of cost.

The computation for composition, enlarged by the various items which enter into it, is followed by one for each of the other things. In presswork allowance must be made for the amount of time the press will be occupied. The job may be colored, requiring the rollers to be very carefully washed and the fountains cleaned out. This takes time and wastes ink, and it has to be repeated when the job is done. The job may have been only a thousand or two, and yet have wasted two-thirds of a day, the cost of the ink being three or four dollars. It would be manifestly wrong to charge at fifty or sixty cents each token for eight tokens if this is the case. It is probable that a press on which such work is executed is worth at least $9 a day. Two-thirds of a day would be $6, and the ink at $4 would make the charge per token $1.25. Less than that would be giving away the profit; much less would be giving away the cost.

Every cost should be put down on paper and the figuring should be completely carried out there. A very common error is to make the charge for presswork just the same as the number of sheets. In general job-work they are just alike, but on bookwork the paper is printed on both sides, giving two presswork. So it is on newspapers. Another error is to underestimate the cost of inks. On common bookwork or ordinary job-work this may amount to very little, but on fine inks, especially where there are large wood-cuts, which require to be worked with a full color, this ink will sometimes cost from fifty cents to a dollar a token. Posters require great quantities of ink, and this waste must be computed, although the ink is of a low grade. Colored inks generally must be put on more heavily than blacks to produce the required effect, and they are very costly. The common charge of double that of black work is not enough.

In computing charges on presswork, if the customary rate by the token aggregates a larger bill than that by hours of the press, it should be so made out; but if the hours show the largest, then that sum should be used. On common work they will be almost exactly alike, if the performance of the machines has been correctly noted.

The customer should not see the items of the bill. It is not his right, any more than it is the right of a man when he orders a coat to know how much thread the tailor will use, how much lining, what the velvet and the buttons will cost, and what the other details are. The objections to showing the items are that no two men make the same calculations. One will make a particular charge high, and on another item may be low, while his competitor may reverse these two parts, the total remaining almost exactly the same. But if the customer should see these estimates in detail he would exclaim that B would give him presswork 10 per cent. cheaper than A; why could not the latter do as well? Then going to B he would declare that A was offering him paper at less than B; could not B buy paper as cheaply as his rival? This hammering down of the price could not take place if the details were not given.

Small jobs should have a greater percentage added to them than large. Estimates should be carefully preserved and pasted in a large book, so that they may again be referred to. It is frequently the case that a customer declares that he had an estimate, say, for $72 on a certain thing. The estimate-book shows that he had that estimate on something distinctly inferior, or that his memory was at fault, the price being $82. Estimates ought always to repeat the order with circumstance, and say when the job should be delivered and where, and this should be carried out, even at a sacrifice. Too many printers will promise a job in two weeks, when it is scarcely possible that with their facilities and the number of men they employ they could get it out, under the most favorable circumstances, within three or four days after.

When a job comes in an estimate should be made of the number of days' work, by one man, it will take to finish it, and the same estimate should be made in the pressroom against one press. All such jobs should be added together and revised each day. The office, therefore, might have in process of delivery 220 days of composition and sixty days of presswork. There are fourteen compositors employed and five presses running. It is therefore evident that there is work for fifteen days and two-thirds in the composing-room and for twelve days in the pressroom. In such an office it would be safe to promise a pamphlet of 128 pages and 10,000 copies to be delivered in one month. It might be done considerably before that if a part of the previously promised work could be put aside or allowed to drag along. Time must be added for make-up and return of proofs, as well as for binding; but the 128 pages would take this force about two days' actual setting. Allow two for return of proof, ten days on one press, or five on two for 80,000 impressions, and two days for binding, the whole would be out of the way in sixteen days from the time it was begun.

Estómago (Sp.).—Opening in the hand-press in which are placed the spindles, springs, &c.

Estrado (Sp.).—A foot-rest, placed under a hand-press; also a wooden galley on the side of a frame to hold matter.

Estrella (Sp.).—Star, asterisk.

Estribo (Sp.).—The plate or tongue on which the feed-gauge rests in machine presses.

Etching is at the present time the kind of engraving most favored by artists. It follows their individuality, is quickly handled and quickly executed, and has when finished none of that primness or weakness frequently found in other engravings. A knowledge of drawing and of light and shade is highly necessary for meritorious work. The ground used in etching is a combination of asphalt, gum mastic and virgin wax. The copper-plate is hammered until it is quite hard, and it is then polished as if intended for the graver. It is heated over a slow charcoal fire, the ground being rubbed over it until every part is thinly and equally varnished. The varnish is then blackened by the smoke of a lamp, that the operator may see the progress and state of his work. The next thing is to transfer the design to the ground, which may be done by drawing it on thin white paper with a lead-pencil and then passing it in contact with the prepared surface of the plate through the rolling-press of the plate-printer; the pencil marks will thus be conveyed firmly to the ground, which will appear in perfect outlines on removing the paper. Another method is to draw the design reversed from the original, rub the back with powdered white chalk, lay it on the ground and trace the required lines through with a blunt point. This operation requires much precaution, or the point will cut the ground. But many who do etchings make the designs directly upon the varnish with a tool, and indeed the drawings would be lost after the first application of the acid. After the plate is prepared the operator, supporting his hand upon a ruler, begins his drawing, taking care always to reach the copper. Every line must be kept distinct throughout the plate, and the most distant should be closer and more regular than those on the foreground. The greater the depth of shade the broader and deeper must the lines be made. When the preliminary etching is completely finished the edges of the plate must be surrounded by a high border of wax, so well secured that water will not penetrate between the plate and it. Aqua-fortis is then diluted with water and poured upon the plate, which undergoes a chemical action wherever it has been laid bare by the needle, while the remainder of the surface is defended by the varnish. The bubbles of fixed air and the saturated portions of metal are carefully brushed away with a feather. After the operator thinks that the acid has acted long enough he pours it off and examines the plate. If the light shades are found to be sufficiently bit in they are covered with varnish or stopped out. The biting is then continued for the second shades, which are next stopped out, and so on. After the process is completed the varnish is melted and wiped off; the plate is then cleaned with oil of turpentine, and any deficiencies in the lines are remedied with the graver. As the acid cannot be made to act with perfect regularity there will always be a roughness not found in line engraving. This very circumstance, however, fits etching for the representation of coarse objects in nature, such as trunks of trees, rocks, broken ground, &c., especially on a large scale. In landscape engraving we generally find a mixture of methods, the coarser parts being etched, while the finer and more delicate are cut with the graver. Letters and written characters are rarely etched. It has become fashionable of late years to print etchings with various tints, such as sepia, instead of black.

Ethiopic.—Printing was first done at Rome in this language in 1513. The names of the letters, their shapes and their order were derived from the Hebrew. There are twenty-six letters, and a number of peculiar characters besides these are used to represent figures. Each separate word is indicated by two points, like an antique colon, following it, and the periods by four or more such points. There are no marks of accentuation, but the vowels are expressed by certain small lines or circles annexed to the top, middle or bottom of the letters themselves, or by the shortening or lengthening of one of the strokes. Thus a font consists of the twenty-six letters, varied to represent each of the seven vowels, or 182 in all. There are twenty-two figures and twelve double letters. The appearance of a line of Ethiopic is that of a line of capitals, as the letters are large and ascending. The figures must be justified in, as there is a line, like a bit of space rule, over the top and under the bottom. Ethiopic is not cast in America, and fonts must be obtained from England or Germany. There is not much Ethiopic literature. The Scriptures were translated into it in the fourth century. The Abyssinian of the present day is its descendant.

Etichetta (Ital.).—A ticket.

Etiqueta (Sp.).—Label.

Étoile (Fr.).—Star, asterisk.

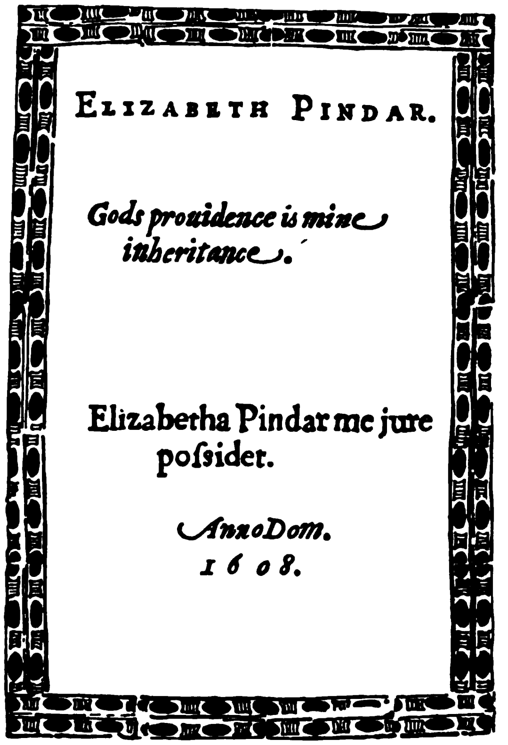
Etruscan, the language used by the inhabitants of the country about Rome before the Romans took possession of it, has been reduced to print. A font was cut by Caslon about 1733. It consists of thirteen characters, M, N, P, R, S, T, A, E, F, H, I, K and L, and four complex characters. The A, I, M and S are like our modern letters; E has the boustrophedon form, or with the transverse lines at the back; H resembles that of to-day, but with lines across the top as well as connecting the centre; a C in the boustrophedon form stands for K; the N, L and T bear resemblances to modern shapes, and the R is a boustrophedon form of Rho. P and F are unlike both Greek and English letters. On the terra-cotta inkstand from which a key to this language was first obtained the characters were engraved in the order of a spelling-book, as ma, me, mo; ba, be, bi. The remains of this language are very scanty.

Even Folios.—The pagination of left-hand pages; 2, 4, 6, 8, 10, &c., are said to be even folios. In the type they are always at the beginning of the page, when in the corner.

Even Pages.—The even numbers in paging, or left-hand pages of a work. The page which is locked up with one in the same quarter is always an odd page. Where the paging is done at the corner of a page, instead of being in the centre, the even folios are at the beginning and the odd at the ending.

Evening Newspaper.—A newspaper published in the afternoon or evening. In many towns these are the principal journals, the morning newspapers being so circumstanced that an effective distribution is impossible, or because there is some special drawback in the way of getting news. Evening newspapers are, too, the strongest in towns near a large city from which good morning dailies can be obtained. As the making of local news generally ends at about 9 or 10 o'clock in the evening, it can be gathered in most places within a radius of fifty or a hundred miles, set up and printed and be delivered at 7 o'clock in the morning at the suburban town where the events happened. An evening newspaper is produced with greater haste than a morning journal. Composition usually begins at 8 or 8:30 o'clock in the large cities, and ends between 2 and 3. Until lately it was impossible to stereotype quickly enough for an evening paper, but that difficulty has now been overcome. Most evening papers in large towns will not mention events of the previous day which happened after they went to press, but take up the narrative of the world at the point where the journals of the same morning left it.

Ex Libris.—Book-plates; the ornamental designs inserted on the inside of the cover of a book or upon one of the fly-leaves to indicate possession. They are usually something after the manner of heraldry, but often with the name and residence at full length. The use of book-plates is one of the fashions of the present day and is likely to continue. Specimens occur in books printed as early as 1516, but in England, France and Germany they became very common in the last century. Many eminent engravers were called upon to execute this class of work, and among the examples of that day still extant are a great number which bear evidence of superior skill. In America, owing to the rarity of engravers before the year 1800, we have few ex libris; but since 1840 they have been tolerably numerous. Paul Revere designed some in the last century. Several books have lately been



ELIZABETH PINDAR.

Gods providence is mine inheritance.

Elizabetha Pindar me jure poſsidet.

Anno Dom.
1608.

EX LIBRIS OF ELIZABETH PINDAR.

published upon this subject, and long series of articles have been written for the magazines upon it.

Excelsior.—The proposed name of a size of type of which the body equals four points, or half a brevier.

Excelsior Card and Job Presses.—The presses formerly manufactured by William Braidwood of New York. Their sizes were small.

Excentrica (Sp.).—Eccentric wheel.

Exchange.—A newspaper or other periodical sent to the office of another journal. No postage is paid upon it, although the weight charge is exacted.

N. Bacon eques auratus & magni sigilli Angliae Custos librum hunc bibliothecae Cantabrig. dicauit.

1574.

EX LIBRIS OF SIR NICHOLAS BACON.

Exchange Cap.—A thin, semi-transparent, highly-calendered, hard and strong paper. It is used for bills of exchange, certificates and other blanks, which must be of light weight, and may receive hard usage. It is not as strong as bond or parchment, but is better adapted for receiving fine impressions. It is usually in flat cap size, 14 by 17 inches, and is about six pounds to the ream. It is found in both white and blue.

Exchange Reader.—A person who reads the exchanges of a newspaper. Such exchanges often reach several hundreds, and in some cases several thousands.

Exclamation, Note of.—This mark (!), sometimes called a note of admiration, is used less frequently than in former years, and is now restricted to phrases of astonishment, joy, terror or other passions, when used in other than a narrative way. If it makes a whole sentence it takes an em quadrat and a capital letter after it; but when it is a part of a sentence it is followed with an en quadrat and a lower-case letter, as in the following: "What love! what pity! what compassion!" It is occasionally repeated. Amongst grammarians the mark is sometimes known as an ecphonene. The rule in Spanish for its use is different from that in all other languages, as it, as well as the mark of interrogation, is twice used, once at the beginning and once at the end of the sentences to which it refers, the first being inverted, as for example:

> Y el Hijo del hombre vá en verdad, como está escrito de él: ¡mas ay de aquel hombre, por quien será entragado el Hijo del hombre! Bueno la fuera á aquel hombre, si nunca hubiera nacido.—*Mark*, xiv, 21.

In American printing-offices the exclamation mark is found in two places—one against the bottom part of the lower-case b, and the other against the top part of the l. The former is preferable. The exclamation is much like an l in a dim light, and is of about the same thickness. It can therefore easily get into the wrong box. The interrogation, with which it exchanges, has a considerably different form, and is not so liable to this confusion. Moxon does not exhibit any place for the exclamation point, and neither does he show a bracket or parenthesis. In Smith's case No. 1, in the year 1755, the interrogation and exclamation points are by the side of each other, where we now place the figures 4 and 5. In his case No. 3, of the same date, the exclamation is at the side of the l, while the interrogation is in the box next to k. Savage, in 1840, gives the same lay as Smith No. 1. It has frequently occurred to founders that as this character is very thin, and always is borne off from the previous letter by a thin space, it would be better to cast the space and the exclamation mark together. On trial, however, this experiment has not proved at all popular. Some have a habit of changing the five-em space for a four-em and a three-em when the line is to be spaced out. This shoulder to the letter interfered with it, or made a preposterous distance between the letter and the mark when the space was put there in addition, and after experiment it was found that the trade would not accept the innovation.

Exemplaire (Fr.).—A specimen or copy of a book or other printed matter.

Exemplar (Ger.).—A copy, an example.

Exeter, N. H.—Robert Fowle, the nephew and partner of a printer in Portsmouth, began working in Exeter in 1774. Two years later he started a newspaper. He was suspected of having counterfeited the paper-money of New Hampshire, and fled to the British lines, but returned after the war.

Expanded.—In England, an extended type, but in America a type made large both ways, up and down and lengthened, with large counters.

This line is set in Expanded.

Extended.—Type in which the horizontal lines have been lengthened. Such letters are much used in some kinds of job-work. The following are examples of an ordinary Gothic and an extended Gothic:

ORDINARY GOTHIC

EXTENDED GOTHIC

The extreme of this form is known as extra extended.

Extension of Color.—One kind of printing-ink will cover more type than another, and is said to have more extension. Black inks have, pound for pound, more extension than colored, and there is a wide difference between colored inks. It will take three pounds of ultramarine to give the same extension as one pound of carmine. As a rule, inks which have as a basis earths or minerals are much heavier than those formed from vegetable growths. See INK and PRESSWORK.

Extra.—1. An edition of a newspaper containing important news and published at an unusual time. 2. In bookbinding, sometimes described as calf extra. A term applied to a book well forwarded, lined with good marbled paper, and which has silk head-bands, gilded with a narrow roll around the sides and inside of the squares.

Extra Condensed.—A kind of type in which the horizontal or down strokes are very much shortened and the perpendicular strokes retain their ordinary length. Such lines are sometimes extremely valuable in job-work where a number of words must be put into a line. In every office there must be a selection of types of ordinary thickness, as well as of those that are thinner and thicker. In the examples below the first words are in antique, while the last are in antique extra condensed:

ORDINARY THICKNESS

EXTRAORDINARY THINNESS

Extra Gilt.—In bookbinding, elaborate and full gilding on the back and side of a book.

Extra-Illustrated.—A book in which additional portraits or other illustrations have been placed. A book is not extra-illustrated no matter how many engravings may be in it when published. It requires the addition of plates taken from other works. When only one or two are thus inserted this title is rarely given, but in many cases one or two hundred illustrations, and in some cases many thousands, are thus used to swell a small book. The plates are mounted on paper equal in size to that of a page of the book, which is taken apart, leaf by leaf, the added plates going between them. See GRANGERIZING.

Extra Packet Post.—A kind of folded writing-paper, 11½ by 18½ inches in size, little used.

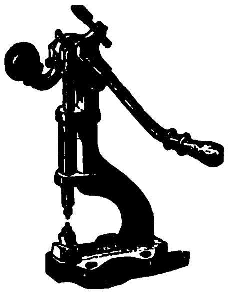
Extra Price.—That kind of composition which is done with more difficulty than common, and for which the workman receives additional pay according to the scale. It is not alone the difficulty, but custom also, which commands extra pay. Thus a mortgage sale, run up, or a court calendar for a newspaper can only be composed with great slowness, yet the printer gets nothing more for either, and they are not considered in the scale. Extra price seems to have been very slowly developed. The first English scale, that of 1785, had for its extras foreign languages and dictionaries, notes and tables. Very small type also took an extra. Afterwards manuscript and solid, in comparison with reprint and leaded, were extras. Since that time, with every alteration of the scale, new extras have been brought in or old phrases defined with more accuracy, so that work should bring a greater price. The London example has been followed everywhere.

Extra Proofs.—On some classes of works, as, for example, dictionaries and encyclopædias, which are to be read by a number of persons in distant places, several proofs must be taken, the cost to be extra beyond the price per thousand ems. Otherwise the custom is for only one proof to the author, editor or publisher, of the first proof and revise.

Extra Work.—That species of binding which is not edition work, or which is better than ordinary binding in cloth.

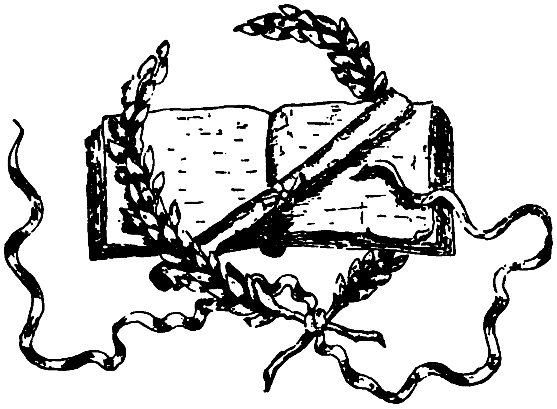
Extras.—The charges involved on composition over and above the fixed price of the text type, such as tables, Greek, modern languages or algebra.

Eye.—The eye should never be rubbed by a compositor unless he first washes his hands, and even then very little. Lead dust is poisonous. He should always wear a shade over his eyes when at work by artificial light, as it relieves them very much, and he should never stand so that when he raises his eyes the light will strike them full in front.



EYELETING-MACHINE.

Eyeleting-Machine.—A machine for punching and inserting the eyelets in show-cards, &c. It is a convenient way of fastening several sheets of paper together. The brass eyelet is at one end turned over, so that when it reaches the hole, which has been previously punched, it is there stopped. The jaws of the machine come together, the tube at the small end is spread out, and the brass is then forced down upon the cardboard or paper, holding it securely. Eyeleted cards are better adapted to hang up than those which simply have holes cut in them, as they are stronger.



F

F THE sixth letter of the alphabet, is the only kerned letter in Roman. The top hangs over and is very liable to break off. Some of the type-founders are in the habit of providing an undue quantity when the font is sold, to avoid the necessity of casting imperfections for it ever afterwards. To prevent the beak from being broken off this letter is cast in a ligature with most of the other tall letters which possibly may crowd against it, as ff, fi, fl, ffi and ffl. In cases where a tall letter other than f, i or l strikes against it a hair space is used to set it off. This is also done at the end of lines in stereotyping which close with f, so that the electrotype or stereotype finisher may not cut off the projecting part when he shaves the edge. An Italic *f* is both ascending and descending, and is kerned at each end. Several attempts have been made to put the beak of the f upon its own body, by cramping the projection, but the proposal has met with but little favor. Lord Stanhope advocated it ninety years ago, and fifty years later one of the Cincinnati foundries made an unsuccessful attempt to induce printers to accept the altered shape. This letter is, usually speaking, about the thickness of the third of an em. The capital bears little resemblance to the small letter. The Romans for a time used F inverted, thus, Ⅎ, for V consonant, as TERMINAℲIT for TERMINAVIT. In Italian and Spanish f is used for ph, as in filosofia and Filadelfia. This was sometimes done by the Romans. F was branded by them upon the forehead of fugitive slaves, signifying fuga. F as a number signified among the Romans 40; with a dash over it 40,000. F on engravings or pictures stands for fecit (made). In jurisprudence ff signifies the Pandects. This abbreviation originated in the early period of the art of printing, when no Greek characters had yet been cast, and ff was used for π, the first letter of the Greek word. On medals and monuments F stands for Fabius, Furius, Filius, Felix, Faustus, &c. With merchants it signifies folio, page; on documents, fiat, let it be done. Fl. is the abbreviation for florin; f. or fr. for franc; ff., in German, for folgende, following. In music it is forte, loud; ff., very loud; standing by itself as a capital it indicates the fourth note in the scale of C.

Fac.—Before the introduction of printing into Europe and its application to the production of books there were artists whose business it was to paint and ornament manuscripts, who were called illuminators; the writers of books first finished their part, and the illuminators, blanks having been left, filled them with ornamental letters and paintings. Blanks are frequently found in manuscripts which never have been filled up. When the art of printing was first applied in Europe to the production of books they were in imitation of manuscripts, but the difference could readily be recognized. Blanks were left at the beginning of the respective divisions of the work for the illuminator to fill in with the proper letters and ornaments, as was usual in manuscripts, and so close was the imitation that, even in our own time, it has required the assistance of a chemical test to ascertain which was manuscript and which was print. Afterwards ornamental letters of a large size were introduced and printed with two colors, generally red and blue, the letter being of one color, and flourishes extending the whole length of the page; in the other, so as to have the appearance of being done with a pen. Then succeeded various grotesque figures in attitudes to resemble letters; afterwards small Roman capital letters, with ornaments around them forming a square design. Subsequently the block was pierced so that any letter could be introduced and the ornamented part be used for any initial. The next descent was for the letter-founders to cast the ornament in type metal and pierce it for general use. These cast ornaments for letters were called facs, as an abbreviation, Savage believes, for fac-similes. The last descent was to the extreme, putting a plain Roman capital letter, frequently extending four or five lines in depth, where the ornaments had previously been.

Fac-Simile.—An exact reproduction; a copy which cannot easily be distinguished from the original; usually applied to works of art, engravings, printed pages or books which closely resemble older pages or books. Fac-similes of ancient printed work are very unfaithfully represented by engravings after them on wood or copper. In the latter case the methods are entirely unlike; in the former the weight of the hand of the engraver or some trifling inattention will make a marked difference. The most faithful reproductions are those by process work; yet from the wrinkles and dirty spots on the paper, the blackness of the original, and the limitations of the art, while the form is preserved too frequently the spirit is lost. Lithography is frequently used to execute fac-similes. As an example of this on a large scale may be pointed out the Paleographic Examples from the ancient manuscripts contained in the library of the Vatican at Rome, at once faithful and beautiful.

Face.—That part of a type which prints, as distinguished from the shank and the shoulder, which support it. It is also employed in expressing one variety of type as distinguished from another. Thus we say plain face and copper face, heavy face and light face. The type that is used in a given book should always be of the same series, although perhaps of different sizes. The faces must harmonize.

Face of the Page.—The upper side of the page, from which the impression is taken.

Faced Rule.—Brass rule with the ordinary thin face somewhat thickened. An English expression.

Facetiæ.—Humorous writings or sayings, but now by a perversion applied to books which gratify an erotic taste. Large collections of this kind have been made, and such books are a specialty with some booksellers, always being distinguished on their catalogues under this head.

Fach (Ger.).—A box of the case.

Facistol (Sp.).—Standing galley.

Factor.—The business manager or the foreman in a printing-office in Germany. It is never used in this sense in typography in England or America, although the word is employed in the mother country to represent an agent with power almost equal to his principal.

Fading Colors.—Many inks, particularly the aniline inks, lose their colors when exposed for some time to the sun or even to daylight. Purples are peculiarly liable to this defect, and more or less all of the bright colors.

The hues derived from coal tar are much more vivid than those from other sources, especially if price is taken into consideration, and it has become a habit with most ink-makers to make a solid basis for a color with some well-known material and then brighten it by mixing in an aniline color resembling the other, but more showy.

Fagan, John.—A printer and stereotyper of Philadelphia who began his art there in 1812. He was born in that city on December 28, 1799. After completing his time he worked several years as a journeyman printer, then entering the office of Jedediah Howe as proof-reader. Mr. Howe was an ingenious Yankee who first carried on stereotyping in New York, afterwards removing to Philadelphia, where Lawrence Johnson had preceded him by a couple of years. On the death of Mr. Howe in 1834 the business was successfully continued by Mr. Fagan, many very important works being brought out then. He survived nearly all of his contemporaries, retiring from business in 1863, and dying a year or two later. He took a warm interest in the improvement of the manufacturing industries of the nation, and frequently wrote in the daily papers in defense of the American or protective system.

JOHN FAGAN.

Fahnencorrectur (Ger.).—Galley-proof of set-up type not yet arranged in proper columns or pages.

Fair Office.—In the language of a member of a typographical union a fair office is a union office where full prices are paid, and an unfair office is one where union rules are not observed and which is not under the control of that society.

Faire le Registre (Fr.).—To make register.

Faithfull, Emily, an English lady who became much interested in the condition of women and established a printing-office in London, known as the Victoria Press, in which they were employed at every kind of work. In 1870 she published an article on this subject, in which she maintained that women made entirely as good compositors as men.

Fake.—A term applied by newspaper men to a made-up narrative, one in which there is little or no truth. Faking may, however, be exercised in supplying details as well as in the creation of the main incidents of a story.

Falsa Portada (Sp.).—Bastard title.

False Motions.—Those unnecessary movements of the hand which some compositors employ, adding nothing to their speed, but rather taking away from it. The commonest motion of this kind is to bring the letter up to the stick, but hit it upon something before it is deposited in its proper place. Other false motions are to carry a type beyond the stick, and return it; to swing it in the air with a great curve; to hit the centre bar of the case, and to keep the part of the line already set in continual motion. All of these can be broken off by determination and system.

Falso Frontispizio (Ital.).—The bastard title or brief title on the second page preceding the real title. It is also called frontispizio morto (dead frontispiece).

Falze (Ger.).—A fold; falzen, to fold.

Fancy Calf.—Colored calfskin, used in binding.

Fancy Types.—Those kinds of type in which other models have been followed than the common Roman and the old-style Roman. They comprise many thousand sizes and styles. See DISPLAY TYPE.

Fanfare.—A style of binding in which there is great profusion and repetition of flowers, foliage and other small ornaments. There are two forms of the fanfare, one being more elaborate than the other.

Fanning.—In order to count paper easily it is necessary to open the edges by grasping with the thumb and forefinger two or three quires and to turn them over by a sharp movement of the wrist. The term is also used for drawing a sheet back from sheets under it by striking it repeatedly with the nails.

Fanshaw, Daniel, an eminent printer of New York, who was born there in the year 1789. He served his time with D. & G. Bruce, and soon after bought, at their solicitation, a part of their printing-office, as they were thenceforth to confine their attention entirely to stereotyping and type-founding. The other part was sold to Mahlon Day, the Quaker printer. After a year's trial Mr. Fanshaw wished to have the Bruces take their office back, but they refused, and he shortly afterwards obtained the printing of the American Bible Society on a ten years' contract. This proved very profitable and was twice renewed, although not for the same length of time. In 1825 he began printing for the American Tract Society. In 1826 he put in the first power-presses ever used in a book office in New York, and shortly after mortgaged his entire establishment that he might have nine more. These were the Treadwell, a press which preceded the Adams and was similar to it. He lost his contract with the Bible Society in 1844, having been bickering with it for several years, as he refused to put in any larger presses than medium and a half, and still insisted upon his rights to the two outside quires of paper in each ream, which had once been considered as a perquisite of the trade, but which was a claim which had been given up by all other printers when the Fourdrinier machine came in. Shortly after the Tract Society undertook to do its own printing, and Mr. Fanshaw's business sunk to very small proportions. He had made much money, however, and invested it in lands up town. At the time of his death, which was on February 20, 1860, he was reputed to be worth a million. The civil war came on, however, just after, and real property depreciated very much. His heirs were glad to get a fraction of this sum. He was very eccentric in his ways. He never wore an overcoat, and in his will directed that his son should be disinherited if he should use tobacco. It was his habit, also, to subscribe and pay in advance for every respectable publication which appeared in his native city.

Fantaisies (Fr.).—Fancy type; ornamental type.

Fantasia (Ital.).—Fancy. Applied to job type.

Faques, Gillam, Guillaume or **William.**—A king's printer in London at the same time with Pynson. They both printed the acts of Parliament made in the nineteenth year of the reign of King Henry VII., in 1503, and styled themselves in each "printers to the king." How long he had been in business before or continued after does not appear, but his books show him to have been an excellent workman. His dwelling was within St. Helen's.

Far Banca (Ital.).—To pay off.

Farbe (Ger.).—Ink.

Farbe Nehmen (Ger.).—To take color, to take ink.

Farbe Umrühren (Ger.).—To distribute ink.

Farbeisen (Ger.).—The ink slice.

Farming.—To engage as a journeyman or foreman for a piece of work or for the work of a room, involving more labor than the contractor can himself perform, and necessitating the employment by him of other hands. This is discouraged in all good offices, and is one of the points upon which both unions and well-informed employers agree.

Farquhar, John M., ex-president of the International Typographical Union, was born near Ayr, Scotland, on April 17, 1832. He came to the United States in 1849, having previously been an apprentice in the office of the Ayr Advertiser. He was employed on several newspapers in Missouri, and in 1852 went to Chicago. He became a member of the Chicago Union in 1853, and its president in 1857. In 1860 and again in 1862 he was elected president of the International Union, while in office collating the general laws and codifying them. There was no session in 1861, occasioned by the secession of the Southern States. He enlisted in the Eighty-ninth Illinois Infantry in the year 1862, and rose to the rank of major, taking part in twenty-seven battles. In 1865 he became a proof-reader on the Chicago Republican, afterwards acting as news editor. He accepted the position of assistant superintendent of the Buffalo Commercial Advertiser, then becoming superintendent, and resigned in 1882 to go into the manufacture of lubricants. He has since then been chosen several times to Congress, devoting special attention to labor matters. While in Congress he secured an annual leave of fifteen days to the employees in the Government Printing-Office.

JOHN M. FARQUHAR.

Fascicules (Fr.).—A part or subdivision of a work which is sent out in numbers.

Fascio (Ital.).—Pi.

Fast Typesetting.—Great interest is felt in this question by printers generally, as well among those who are slow as among those who are quick. Henry George, in one of his essays, says that he has known many printers, some slow and some fast, but he has never known one so quick that he was twice as fast as the slowest. Most journeymen of experience would not agree with him that these two figures represent the highest and lowest rate of speed. Almost all calculations of this kind must be based on newspaper work, for in bookwork and job-work there is so much variety and there are so many hindering circumstances that a fair trial could scarcely be had. On newspapers the average man can set, distribute and correct seven thousand ems in a day of ten hours. One who could do no more than six thousand in that time would be regarded as slow, while to do only five thousand would be very slow. Yet here and there is a man who cannot accomplish even as much as this, four and a half thousand being all that can thus be put into the stick and back into the case. Perhaps not more than one or two out of a thousand are as slow as this. It seems to come from extreme deliberation and natural stiffness of movement. On the other hand, those who can set and perfect eight and nine thousand ems in a day are comparatively numerous, and some can reach ten thousand. Many printers believe that this is the ultimatum of speed, and that except for an hour or two no greater velocity can be attained. They have not seen the best workers.

In examining the movements of any ordinary compositor it will be seen that some lines are put into the stick in a great deal better time than the average for the whole, and that parts of lines are set at a ratio greater than the best lines. A fast compositor simply sets his whole stick or galley at the rate which another maintains for a few words. There is a stoppage to consider the copy; a bad letter must be taken out or an overturned letter made right; the eye glances aside from time to time to see what is going on in the office, and energy becomes relaxed as the mind passes from the copy to some other subject. This relaxation of energy and attention to things outside of his work inflicts much loss upon the compositor, and false motions, a foul case and deficient education have their share in lessening his bills. Speed is not so much in increasing the swiftness of the hand as in making each type appear in the stick in the same time as every other type. In setting fifteen hundred solid ems an hour the hand goes to the boxes about four thousand times. Allowing one-fifth for justification, the average type is picked up at the rate of eighty-four letters in a minute, or seven letters in five seconds. There probably never existed a compositor so slow that he has not sometimes set the seven letters in the time given, and most compositors have frequently set eighty-four letters in a minute; but with the slow compositor, stopping twice in an ordinary line to look at his copy, and losing from three to six seconds each time, or perhaps taking two or three seconds to get out a ffl or a capital, his time is lost by driblets. Well-authenticated cases of workmen putting in two or even more type a second for some considerable time are to be found—a speed sufficient to carry the men close up to three thousand ems an hour, instead of two, if it could be continued.

At the beginning of the civil war the New York Tribune had five compositors out of thirty-four whose habitual bills were seventy-five thousand or more ems a week. One, Hugh Morton, set eighty thousand ems per week for a whole year, although occasionally losing a day. In that year he set, distributed and corrected over 4,200,000 ems. He did not have the ship news, and had no department. Hours were then long, but to do this it was necessary to set a thousand ems in thirty-eight minutes, to distribute it in thirteen minutes, and to correct it in a minute and a half. This was done the twelfth hour in the day as well as the first, and on bad copy as well as good. There were days when he set eighteen hundred ems an hour for nine hours. Other workmen in the same office nearly equaled him and some exceeded him for speed. Benjamin F. Glasby sometimes reached ninety-four thousand ems in eighty hours' work. One hundred thousand ems were set on the Times in 1858 by Mortimer F. Rainey, and on the Tribune in 1860 by Andrew J. Isham. Each of these men spaced well, justified well and had good proofs. Glasby, in addition to being the swiftest workman of his day, was the most accurate.

These feats were equaled in some other offices. Henry Keeling of Utica set one hundred and two thousand and distributed about eighty thousand ems in a week of sixty hours. The matter was rather fatter than usual and was all leaded. Sylvester Bailey, now on the Evening Sun of New York, set twenty-two hundred ems of solid long primer in one hour in Utica when he was a boy. Another compositor there, Joseph Ball, put up two thousand ems of solid bourgeois in the same time.

It would seem, therefore, from the examples cited that more speedy composition can be done than is believed. Several of these workmen were personally known to the writer, and he has seen many of their feats and is assured by competent judges that they witnessed the others. None of these reports are stated on common hearsay. If, therefore, it is possible for workmen to set seventeen or eighteen hundred ems an hour a whole week, why should not a very much greater speed be attained for a short time? The style of composition of the best men was perfection. Ball picked up his types apparently by laying his finger on them; Keeling had his arranged in the case like cordwood; Vincent, a famous workman, caused his arm to move back and forth like the piston of a steam-engine; Shaw, a well-known Canadian, had the same motion, but in a lighter form; and Bailey seized his with the quick, certain grasp of a bird. One of the most celebrated of these men was once asked privately, while among his friends, what rate he thought would be possible for some man to attain, in the same way that the trotting horse may attain two minutes, although that has not yet been done. He replied that he believed that some one would be found sooner or later to set five hundred ems in eleven minutes. This is at the rate of twenty-seven hundred ems an hour. In view of this and of the great number of attested feats varying from seventeen to twenty-two hundred ems, it would seem that a great number of our present workmen could learn to increase their rate from two to four hundred ems an hour. Their quickness in other things is undoubted, and all that they need is to avoid bad habits and to work upon system.

The case should be carefully distributed, with spaces well assorted, and type neither too abundant nor too low. A good light is essential to rapid performance. Copy should be read while picking up spaces, but if more time is required to make certain it should be taken. So far as possible space out the line while setting. Justify quickly, and while this is going on read the line in metal. This is the appropriate time. The taking into the stick completes the movement of each type, and while it is being dropped the eye should pass to the next box and determine upon the type next to be caught. When seized, it should be in such a way as to require very little turning, for if it is to be changed entirely around the hand will reach the stick before the turning is complete and time will be lost. The best way is to take the letter near the head as it lies in the direction of the greatest length of the case. The nick should either be up or turned towards the top bar of the case. The hand should go out in one motion and return in another, losing no time. There should be no fumbling for the letter. The stick should follow the hand partly around the case. It is, of course, needless to repeat what has been said under other heads about education, or to insist upon the compositor understanding his copy. No unintelligent workman can succeed as a fast compositor unless he is like Pace, who found it paid him to exchange leaded manuscript for solid reprint. He was a workman of remarkable speed who lived in New York forty years ago, but who never made good time on manuscript.

Feats recorded in previous publications are those of John J. Hand of New York, who undertook to set up 32,000 ems in twenty-four hours. He failed by thirty-two ems only. Robert Bonner, the former proprietor of the New York Ledger, is said to have set up 25,500 ems in twenty hours and twenty-eight minutes. George Arensburg, commonly known as the Velocipede, set in 1871 against time, in the presence of judges and bets depending upon it, 2,064 ems of solid minion in one hour.

In 1885, 1886 and 1887 much interest was taken in this question by the printers in nearly all the leading cities. On January 11, 1886, a contest took place in Chicago, lasting a week, each person setting type for an hour and a half twice daily, or twenty-one hours in all. A committee from the Typographical Union supervised the race. The result was as follows:

CONTESTANTS.	Gross.	Minutes Correcting.	Net.
Wm. C. Barnes, New York . .	40,675½	58	39,225½
Joseph W. McCann, New York	40,848½	101¾	37,805½
Thomas Levy, Chicago . . .	36,540	105	34,015
Joseph M. Hudson, Chicago .	34,844½	37¼	33,913¼
Leo Monheimer, Chicago . .	35,605	72¾	33,346¼
W. J. Creevy, Chicago . . .	34,628½	54	33,278½
"Kid" De Jarnett, Chicago .	33,956½	108¾	31,302¾

The best hour for McCann was 2,150, and for Barnes 2,093 ems. A prior contest had taken place in New York in which McCann had set 8,062½ ems and Barnes 7,951 ems in four hours. On March 27, 1886, Alexander Duguid, of the Cincinnati Enquirer, set in a race in Philadelphia in an hour and a half 3,416 ems, or at the rate of 2,277⅓ ems an hour. Four minutes were consumed in correcting, and twenty-five ems were deducted for each minute so spent. The same day Mr. Duguid set 3,388 ems in the same time, requiring two and three-quarters minutes for corrections, making the highest net record 3,319¼. The type used was nonpareil, seventeen and two-thirds ems to the alphabet, and the measure twenty-eight ems. At the same contest William C. Barnes set 1,821 ems an hour with the lower case reversed or turned around, and afterwards 1,635 ems an hour with his eyes blindfolded. Three letters were wrong in the proof on this account; a b for a c, an f for an s and a p for a y. Barnes's best speed was 3,217 in an hour and a half, and McCann's was 3,347. It will be noticed that the type was fat. The score made for thirty-three hours was as follows:

CONTESTANTS.	Gross.	Minutes Correcting.	Net.
Alexander Duguid, Cincinnati	71,119	76¾	69,200¼
Joseph W. McCann, New York	71,445	101½	68,907½
Wm. C. Barnes, New York . .	66,788	42¾	65,714¼
Thomas Levy, Chicago . . .	64,943	145¾	61,299¼
Peter Thienes, Philadelphia .	60,828	32	59,498
J. A. Washington, Philadelphia	54,927	65½	53,289½
James J. Nolan, Philadelphia	53,638	42½	52,575½
W. H. Crane, Philadelphia . .	49,803	94¾	47,434¼

Fat.—In composition, any work which, without additional exertion, will enable the typesetter to make a greater bill. Poetry is fat; so is leaded matter. Double-leaded matter with many break lines is very fat.

Fat-Faced or **Fat Letter.**—Type which is broader than usual, or in which the heavy lines are heavier than common.

Fat Form.—When the pressman has a single pull. Obsolete.

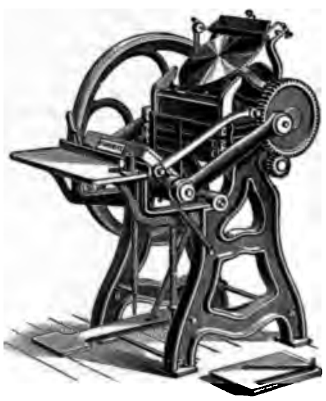
Father of the Chapel.—The presiding officer of a chapel or organization of workmen in a printing-office. See CHAPEL.

Faulkner, George.—The first who carried printing to a high degree of credit in Ireland. He was in the employment of Bowyer in London in 1726, and went to Dublin shortly after. He was the confidential printer of Dean Swift and enjoyed the friendship and patronage of Lord Chesterfield. He made a fortune by his newspaper, the Journal, and died on August 28, 1775.

Faust.—See under FUST.

Faux-Titre (Fr.).—Bastard title.

Favorite Press.—A small jobbing-press, made in New York, and running very smoothly and easily. There is a rotary motion of the inking-plate, and attached to it is a fountain. The bed is perpendicular and stationary, the tympan advancing to meet it, the press being operated either by a treadle or by steam-power.



FAVORITE PRESS.

Feathering the Brush.—In binding, dabbing a brush with glue upon it down upon its centre, and thus spreading the hairs to their utmost capacity and at the same time equalizing the glue in its distribution.

Fecit.—A Latin word, signifying "he has made it," frequently added to the name of the artist inscribed upon an engraving or picture, to indicate the designer.

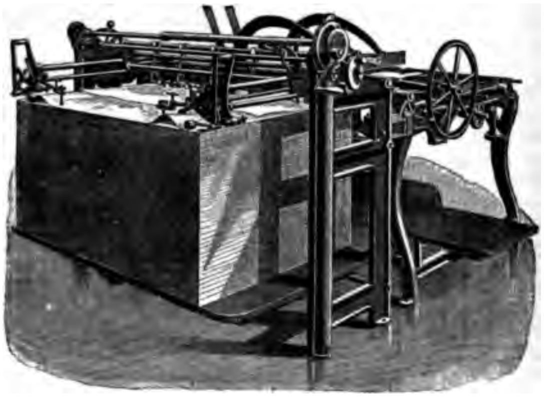
Feeder.—The person who supplies the printing-press with paper, sheet by sheet. In most American offices this is done by large boys, but occasionally by men, and sometimes by women. The latter were generally employed while the Adams presses were in operation. The Adams machines did not move at a high rate of speed, and the sheets were not large and upon them the girls did very satisfactory work. When the Adams presses were superseded by cylinder presses boys took the places of girls, as they had more physical strength and could stand more fatigue. The size of the presses has continually been enlarged, and with it the size of the sheets, while long runs have become much more common. Older boys were employed for this purpose, and now many of the feeders are men with families. It is not, however, skilled labor, the whole mystery being quickly acquired, and the wages are consequently far below what they should be, in view of the necessities of the feeders. As boys of from sixteen to eighteen they earn high wages, and are just as useful to their employers as those of twice their age and twenty years of experience. These considerations have led some employers to view favorably the idea of letting every feeder go at the age of twenty-one. Higher wages cannot be afforded, and it would be mistaken kindness to the young men to let them remain in such positions while they are still young enough to learn a trade or other useful employment. Boys and young men on cylinder presses receive from seven to nine dollars a week in New York. In some few places they get ten. They are demanding on magazines and other periodical work with long runs from ten to twelve, and on all-night work from twelve to fourteen dollars. Girls get in Philadelphia, where they are most largely employed, about six dollars a week; in New York they have received seven dollars.

The feeder is in England called the stroker. There as here he may have been an errand-boy or fly-boy, or he may have been employed in feeding on a small press. He lays up his own paper. Each sheet must be fed in perfectly straight, or the register will be bad. He is not expected usually to take off his paper from the delivery-board, which is done by the pressman, who places each heap on a table close by. To omit feeding a sheet is a great error, or to feed two. The speed of the press is generally keyed pretty high, so that the feeder requires to be both quick and sure of nerve. At the highest rates of speed few can feed, as they become nervous. Girls do not put up their own paper. When the presses are stopped it is expected that the feeders will do any other work assigned them, such as cleaning rollers, cleaning presses, opening paper or anything else that may be desired. They are in exactly the same position as errand-boys. They are to do what they are told. Of course most of their time is occupied with feeding, and it is more profitable to employ them at that than at anything else. In three months a feeder should be proficient on small-sized common work; and in eighteen months as good as he ever can be.

The management of feeders is the most perplexing problem that a printer has to meet. Paid largely, considered as boys, and certain of employment, they are very irregular in attendance, quick to take offense, and leave without warning. In many offices, particularly where the work is transient, they demand to be "staked," or given sustenance money, every night. Out of twenty-eight who left one of our large cities to go to another, on account of a strike, only one carried any baggage, even a bundle. It may readily be conceived how difficult it is to treat with or to manage them, and the certainty that they cannot rise operates to keep them unsteady. Pressmen in most places have a regulation that only so many apprentices shall be allowed, and this number is so small that they have no opportunity as a class to learn presswork, which is the natural ending of the beginning they have made. To deal with them therefore requires much patience and much prudence. Many employers hope that feeding-machines will enable them finally to dispense with this class of help or to lessen the numbers of those employed at this labor to so great an extent that they shall be able to take care of them when they are men as well as they have been able to do for them as boys. Web-feeding, if all kinds of paper were thus made, and if the paper were as well adapted to flat-bed presses as it is to rotary presses, would solve the problem.

Feeding-Board.—The board or platform at the top of the press upon which the paper to be printed lies and where the sheets are supplied to the cylinder.

Feeding-Machine.—Perhaps nothing can be more earnestly desired by printers than a feeding-machine or feeding attachment to a press. The irregularity with which the feeders do their work and the frequent squabbles with them have disposed master printers to look with favor on any machinery which will tend to mechanical or automatic feeding. Paper as it reaches the printing-office is flat, one sheet being piled upon another. There is too much friction to slide one off of the top without at the same time sliding several others a part of the way. Corrugating the sheet is likely to act upon other sheets below it in the same manner, and pneumatic suction has a drawback in doing too much or too little. By this plan disks are laid upon the sheets of paper. In the centre of these disks is a tube from which the air is exhausted as soon as it touches the sheet. It raises each sheet partly and then carries it to be caught by the grippers of the press. An English printer's newspaper declares that such feeding-machines used in England are altogether untrustworthy. They do not feed accurately. Much paper is sent in crooked, or, if straight, a little too far or not far enough. If the paper is thin, damp or porous, the probability is that several sheets will be sent in together. Accordingly, the waste by spoilage more than neutralizes the saving effected by dispensing with the human feeder. The apparatus, too, is complicated, and a mischievous boy sticking a bodkin into the pneumatic tubes disarranges everything and brings the mechanism to a dead stop. An English machine, the invention of Edward T. Cleathero and Joseph A. Nichols, is said to work satisfactorily. In this, mounted on a vertically-sliding frame having a motion somewhat like that of the vibrator rollers, there is a horizontal spindle carrying two or more disks with india-rubber surfaces. The disks



SEDGWICK PAPER-FEEDER.

rest upon the pile of paper, so that when they are revolved they feed the top sheet of paper forward from the pile. Pieces or segments of the disks are cut off at one point, so that while performing a complete revolution they come to rest temporarily when the flat part is presented to the pile of paper. In this position they are not in contact with the paper. By their rotation they feed the paper forward a certain distance until it is seized by gripping rollers, and then by remaining stationary the disks allow the remainder of the sheet to be drawn from under them. The period of rest is made to correspond with that of the feeding-cylinder of the printing-machine, so that the sheets of paper are fed forward exactly in accordance with the motion of the cylinder.

The Sedgwick feeding-machine is now in use in this country. Two small rubber wheels, one on each side, cause the paper to curve upward, the sheet at the same time being held firmly by two stationary arms. This allows blades to enter beneath the sheet. When the time comes for the sheet to be passed out the knives raise it, it is pushed along by another piece of mechanism, and then caught and drawn out by the press grippers. The whole pile is raised automatically, little by little, as the paper is fed away. This apparatus is largely used on ruling and folding machines and to some extent is attached to printing-presses.

Feet.—The bottom of a type is sometimes thus called, but it is more generally known as the foot.

Feet of a Press.—In a wooden hand-press, the solid timbers laid upon the floor from the centre of the press backward, into which the principal upright posts were securely fastened. They were thirty-seven inches long and twenty-two inches apart.

Feet, Off Its.—Type which does not stand perfectly perpendicular. It stands upon two of its corners, and the highest portion of the character is therefore a little above type high. If it stands upon the upper edge the lower edge prints and the upper edge is faint, and if it leans to one side that side is low and the other high. It is a great fault, and should never be allowed to occur in matter which is made up.

Feint Lines.—The small blue lines made in account-books and other mercantile and statistical work by a ruling-machine. This spelling is retained in deference to usage, but it is difficult to say why it ever should have been adopted. A workman in ruling a line does not seem to attempt to draw it, and then withdraw or fail. He does lay it down, the line then being faint, and not a feint.

Feinte (Fr.).—A dark spot in printing, owing to unequal distribution.

Felt.—In the hand process of making paper a piece of woolen cloth spread between each sheet of paper, and upon which the sheets are laid when detached from the wire of the mold. The felts prevent the sheets of paper from adhesion when in the press and aid in the extraction of the moisture. In machine-made paper, endless aprons or webs, which answer the same purpose. See Paper-Making.

Felt Typesetting Machine.—A patent was granted to Charles W. Felt of Salem, Mass., in 1867, after a labor of sixteen years, for a machine for justifying type. He had also invented a typesetting machine. Neither machine was ever commercially used.

Female Compositor.—For many years it has been believed by persons outside of the trade that women are particularly adapted to the work of typesetting, as their fingers are delicate, their perceptions quick and their motions active. This belief has not been shared by printers generally, as the latter know how many other qualities are requisite to make a good compositor. Only during the last forty years have any considerable number of women been employed at typesetting and their adaptability to the business been gauged. Soon after 1845 girls were largely employed in Boston and other towns in New England, and by 1850 some were to be found in almost every prominent town in the North. The work to which they were assigned was chiefly that of weekly newspapers, and in some cases they advanced far enough to make up the forms. Very few were ever put upon job-work. In 1868 or 1869 there were a large number at work in New York, Harper & Brothers having over forty in one room, and the World being at one time entirely set up by them. Their wages then were from five to ten cents a thousand less than was paid to the men, but shortly after an organization was effected among them, known as Woman's Union No. 1, which asked for equal wages with the men and at last obtained them. The union lasted two or three years, but finally dissolved, the membership having fallen off very much. The master printers preferred, if they had to pay full wages, men to women. Since that time the number has much diminished. There might have been five hundred women compositors in New York in 1870 ; there are now probably two hundred. A little before this Miss Emily Faithfull, an English lady, struck with the difficulty with which women obtained employment at some trades which were lucrative to men, determined to establish a large printing-office in London, and succeeded in getting several other ladies and gentlemen to co-operate with her. She entitled her office the Victoria Press. Many women were employed, but the experiment as a whole was unsuccessful, although it lasted a number of years. Boston is now the place in the United States where women are most largely utilized in printing. A sixth or seventh part of the whole number of compositors in that city are women. In one office they are put on very difficult work, such as Greek, Latin and algebra, and give satisfaction. In New York daily newspaper offices there are several who work as distributers. There must be several thousand female compositors in the United States.

In France great efforts have been made to introduce women into composing-rooms, and with success. Very few are now employed in Great Britain, and the Typographical Society there will not admit them as members. Neither are there many in any other country. It will thus be seen that nearly all of the recent experience of the world is in America and France.

From the remotest ages of the art women have been employed in printing-offices. Elsewhere an account is given of the second wife of William Bowyer the junior, whose attainments were so varied that she could read critically the most difficult works which passed through her husband's hands. The first press brought to the present United States came with Mrs. Glover, whose husband died on the voyage, and who thus may be considered to be the first owner of an office here, it being afterwards managed by her second husband, who was president of Harvard College. Mrs. Bradford probably assisted her husband when he began business in Philadelphia, as she was the daughter of a printer and the sister of another. One of the daughters of Isaac Collins was an exceedingly good proof-reader and compositor, and from 1800 to the present time there have not failed to be some women proficient in the art.

The advocates of them as compositors point out that women are cleanly, orderly and to be depended upon. They have no blue Mondays, and no days when they are taken away by drink. The part of the printing-office in which they work is cleaner than any other, and their presence checks vulgarity and improves the moral tone of the place. They are tractable and not liable to go away on strikes. Their opponents declare that they have no disposition to learn difficult work, even if well paid ; that they always remain children, depending upon the foreman and the proof-reader for knowledge of those things which every moderately well-informed journeyman is obliged to learn, and that the short period during which they stay at the business is always liable to be interrupted by marriage. How can they learn to do work well when they only remain at case for two or three years, or, at most, for five or six? They require much waiting on, as their cases are too heavy for them to shake, and the galleys frequently weigh a great deal. They rarely learn more than the rudiments of the business, and cannot be depended upon where accuracy of capitalization or hyphenizing is required. As a rule their proofs are not good. They take up more space than male compositors, person for person, and as more women than men are needed to do the same amount of work larger rooms must be provided, and consequently more rent must be paid. There are also inconveniences in the employment of women on books which, like medical works, treat on subjects which are generally not spoken of between the sexes.

There is truth in each of these views, arising from the different treatment of men and women by employers. Women are favored the most, and consequently are not so thorough. Boys enter printing-offices at fifteen and are only passable hands at twenty-one. Girls rarely stay much more than half this length of time at the case. They are not given difficult work, and most of them are selected from that class of girls found behind counters and in other workshops. Thus very little can be expected from them. The journeymen in our great cities begin with as little education, but the trade is finally acquired by them in a measure; otherwise they would not be employed. They meet with many hard knocks. In the office in Boston which has been mentioned the girls are graduates from school. They can pass examinations on grammar, the mathematics and the rudiments of Latin and French. Under these circumstances the process of copying a manuscript into leaden letters, each word being properly spelled, and the whole well punctuated, capitalized and spaced is easily performed. The original is understood, and there is no difficulty in selecting the equivalent. But to the ill-informed girl this certainty is denied; she must always grope.

Girls are usually paid less wages than men, whether by the week or piece. As a rule they do less, although here and there some girls are found who are very speedy. In most printing-offices, rather than pay them equal wages with the men, they would not be retained. It is well to put them apart in a room by themselves if their number is great. Special dressing-rooms, &c., should be provided, and any rude or coarse behavior towards them on the part of the male workmen should be followed by instant dismissal of the offenders.

Fergus, Robert, a veteran printer in Chicago, born in 1815 in Glasgow, Scotland, and at fourteen apprenticed to George Brookman and Robert Hutchinson, proprietors of the University printing-office at Villafields, came to America in the year 1839. Shortly after he took up his residence at Chicago, then a place of three thousand inhabitants. In 1842 he began the Quidnunc, the first one-cent daily paper published west of the Alleghanies. In 1843 his firm published the first city directory of Chicago. Two years later he added a stock of type from White's foundry in New York, and thus began the first printer's warehouse in Chicago.

Ferguson, James McIntyre, a printer of Philadelphia, was born in Ireland in 1834. He came to this country in 1847, and served his time with William S. Young in Philadelphia. Before he was out of his apprenticeship he was intrusted by his employer with the charge of the Westminster Herald, at New Wilmington, Pa., and there studied for two years in the local academy. Subsequently removing to Pittsburgh, he established there the United Presbyterian. He afterwards returned to Philadelphia, purchased the Christian Instructor and started the Youth's Evangelist. In 1879 his house became known as that of Ferguson Brothers & Co. He did much to forward the Centennial celebration in that city and to encourage the Schuylkill Navy. He died on November 5, 1885.

Fergusson, James, a printer of England, who attempted to fix the various standards of type by comparing them with each other. Twelve lines of nonpareil were to make the inch, and fourteen lines were to be the common measure of all the other sizes. This measure should take in five lines of great primer, six of English, seven of pica, eight of small pica, nine of long primer, ten of bourgeois, eleven of brevier and twelve of minion. Eleven lines of nonpareil were to be the standard height to paper. Compared with the ideal standard given by Hansard, they are a little smaller in long primer and brevier and a little larger in English, pica and small pica. In the figures following, showing the number of ems to the foot, Hansard's are given the first and those of Fergusson the second: Great primer, 51¼, 51½; English, 64, 62; pica, 71½, 72; small pica, 83, 82; long primer, 89, 92½; bourgeois, 102¼, 103; brevier, 112½, 113; minion, 128, 123½; nonpareil, 143, 144. This theory fits better to the sizes of types as they have been made up to the present time than any other, and would have required less adjustment of matrixes to put it into effect.

Feuchtbrett (Ger.).—The wetting-board.

Feuchten (Ger.).—To wet, to moisten.

Feuille (Fr.).—A sheet or leaf.

Feuillet (Fr.).—Leaf; feuillet blanc, blank leaf.

Ficelles (Fr.).—Page-cords.

Figgins, Vincent, a type-founder in England, born in 1766, was an apprentice to Joseph Jackson. The latter devolved the entire management of the foundry upon him for some years, and when Jackson died Figgins naturally expected to become his successor. The place was, however, sold to Caslon, and Figgins soon after began the type-founding business for himself. The grace and accuracy of his cutting procured him many orders, and he soon became prosperous. He duplicated the type which had been used in the first part of Macklin's Bible, and did the same for Bowyer's edition of Hume in double pica. In 1805 he made a new face for the Domesday Book and in 1817 a small-pica Hebrew with points, his foundry being well stocked with all necessary characters. He died on February 29, 1844, and was succeeded by his son, Vincent Figgins, who died in 1860. The business is at present carried on by James Figgins.

Figures.—Arabic figures are nearly always used for numerals at the present time, Roman capitals being employed only in subdivisions, chapter headings, the years of publication and a few other places. Arabic characters are ten in number, and each is of the same thickness, generally an en; but Bruce has for the last twenty years made them thicker than this, which admits of a much clearer representation of their faces. The London Times and some other English journals have condensed them to a thick space, making them taller at the same time. Where as many as three of the figures come together and another is added a comma separates the three from the one, and this rule holds good in every mass of figures. Each three takes a comma. The year of our Lord, however, or any date, although of four figures, does not need one; nor is this rule always followed in street numbers. Some print No. 2001 Chestnut street. Formerly many printers omitted the comma with four figures, but the present usage in favor of its retention is almost unanimous. Sometimes commas are omitted in tables which are very close. In this country the figures are always at the right upper corner of the lower case, but in England they are generally in some position in the upper case, a much more difficult place for the workmen to get hold of them. To this the daily newspapers are an exception. The earliest represented case in English, that of Moxon, places the figures in the two lower rows of the upper case at the left-hand side; this plan is imitated in Smith's case No. 3 in 1755, and in Savage's in 1840. Smith's case No. 1 puts them one row higher, and this was followed in England till the long s was discarded, when the case to a certain extent was modified. Lord Stanhope in 1800 thought they should be on the right-hand side of the capital case, making the three nearest boxes to the crossbar in each of the three lowest rows. In the old French case the figures are as with us, and as far as the difference in shape will allow are in that position in the new or consolidated French case.

There is usually some irregularity about the running of figures. It is possible to conceive of a tabular work in which there shall be almost exactly the same number employed of one as of another, but this very rarely happens. In a census report, for instance, the ages of the inhabitants will far more frequently be given as forty-five than as forty-four or forty-three, yet there are more persons living at each of these years than at forty-five. The result of this would be in a printing-office that there would be a run on 5. Every series begins with 1, and all round numbers end with a 0, while 5 has an undue proportion, owing to the tendency to inexactness which is natural to man. The figures of a series which begins with 1 may stop at 3 or 4 or 5, and then, of course, the smaller figures are more in demand. The disproportion is such that for thirteen hundred of the figures 1 and 0 there are twelve hundred of the 2 and eleven hundred of the 3, while all of the other figures have only a thousand each. Figures are frequently put in a special little case, often made of tin, containing besides them only commas, en quadrats, em and two and three em quadrats and leaders. Such a case is very convenient in setting tables. Dotted figures, as

$\dot{1}\quad \dot{2}\quad \dot{3}\quad \dot{4}\quad \dot{5}\quad \dot{6}\quad \dot{7}\quad \dot{8}\quad \dot{9}\quad \dot{0},$

are used in some calculations, as are scratched figures, like:

1̸ 2̸ 3̸ 4̸ 5̸ 6̸ 7̸ 8̸ 9̸ 0̸.

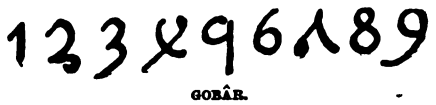
It will sometimes happen that a regular Roman face will have old-style figures put with it, for the reason that it is thought that they are more easy for the eye to catch, as they rise and fall below the line. They look too small in lines of capitals. Italic figures are also cast, and have now become common. The appearance of work is certainly improved by their use, and would be still better were not many kinds badly cut.

Figures require no periods or commas after them to indicate a subdivision or end of a sentence when used in the tabular way. This would not have been adverted upon except for the fact that one of the long-established quarterly reviews of Great Britain has such an eccentricity, and all of the way down the last column there must be left a thin space or four-em space to allow for the period which ends the sum total of the table. Neither do periods accompany page folios or signatures when these are figures. Figures should be set off from a brass rule by a lead, an en quadrat or a small space when they occur together in tabular matter. When ordinary figures are used in a job to make a fraction, both the numerator and denominator should be of some larger and heavier face than the regular Roman which would fill the place. Nonpareil figures are sometimes used as superiors in lines of bourgeois and above—pearl for minion to bourgeois, and diamond for agate, nonpareil or minion. To justify easily, however, they should be nonpareil for pica and agate for small pica, but these are rather too small. English and American taste does not incline to the usage in notes of printing the reference in full-sized figures inclosed in parentheses, as (3), which is frequent in German and French typography. Figures of a size or two larger than those of the text are sometimes used in page folios when the wording is in Italic or capitals, as they are hardly so large as they should be in such an isolated place; but if the heading is in small capitals the figures of the font are large enough.

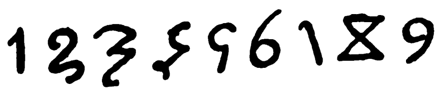
Logotypes are sometimes made of figures, but never for the idea of speed, but rather that of correctness and also for the firmness and solidity of the page. Logotypes of figures are cast on a slug the width of a column and are used by compositors on daily papers to mark the matter which they have set. Each compositor is known by a number.

In denoting old style and new style the years are sometimes placed beneath each other, as: February $\substack{11\\22}$, 1732, or January 6, $\substack{1605\\1606}$. According to one computation one date is used; according to the other another date. A convenient method of writing them is: February 11–22, 1732, or January 6, 1605–1606.

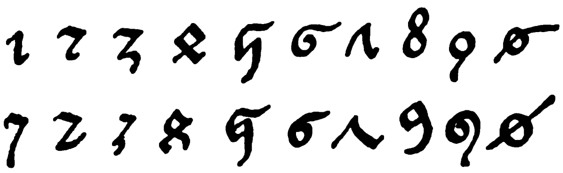
Arabic figures were first introduced in Europe in the twelfth century. The novelty was then known as the Indian system. It had been employed in the East for several centuries, but it is uncertain when or from whom it originated. The zero was at first wanting, and did not come into use until between 813 and 833. When figures began to be employed those who had been educated to the use of the other numerals objected to the novelty. In 1299 the Florentine money changers were forbidden to reckon in figures, while the statutes of the University of Padua prescribed that the price of books should be given on the title-page, "not by ciphers, but by legible letters." The form varied from year to year, not only in the formal style, as in inscriptions upon monuments, but in writing. The original Arabic figures are those shown



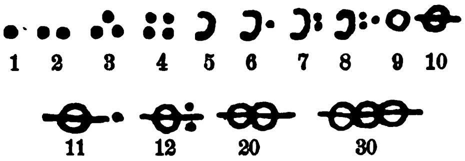
GOBÂR.



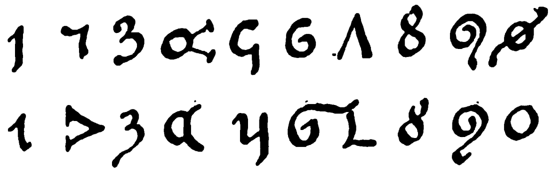
FOURTEENTH CENTURY.



THIRTEENTH CENTURY.



MANUSCRIPT OF THE FOURTEENTH CENTURY.



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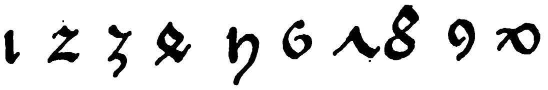
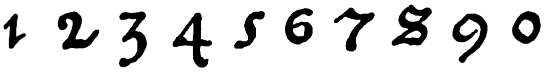


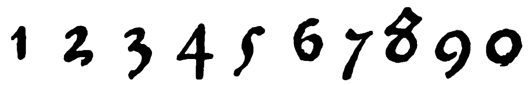
FIFTEENTH CENTURY.

as Gobâr. In the fourteenth century there was little change. The dotted diagram is from a manuscript of the fourteenth century. Roman characters were often intermingled with the Arabic. An inscription upon a tomb at Salzburg has 1463 written 1.4.LXIII, while 1456



SIXTEENTH CENTURY.

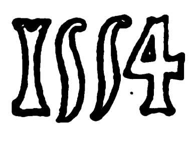
on an ecclesiastical seal is rendered M456. Those characters which have been changed the most are 4, 5 and 7.



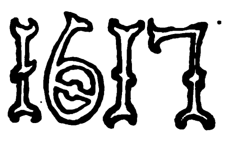
SEVENTEENTH CENTURY.

The figures as changed from their introduction down to the time of Louis XIV. are shown in the illustrations on this and the preceding page.

The examples next following are taken from buildings where they served to announce the date of erection:



SALISBURY CATHEDRAL.
1554.



HOUSE IN AIX-LA-CHAPELLE.
1617.

Filete (Sp.).—Metal rule.

Filets (Fr.).—Rules; or, as would be said in England and America, brass rules. These are, however, almost unknown in France, where copper, zinc or type-metal rules are used. In bookbinding, fillets.

Filetti (Ital.).—Rule.

Fillet.—A hand-tool used in finishing in bookbinding, upon which a line or lines are engraved.

FILLET.

Filling In.—Putting the sheets, after printing and drying, between glazed boards prior to pressing.

Filosofia (Ital.).—Body eleven of the Italian series, or about small pica.

Fils (Ger.).—A blanket.

Fine Work.—All of the older books on typography devote much space to fine printing. When these works were written this could alone be executed upon the hand-press, either wood or iron, as the power-press for the first fifty years of its use could not be depended upon for a very high grade of work. The wooden hand-press was the instrument used by Baskerville and Bodoni for their masterpieces, but it was uneven and uncertain. When the iron press came in pressmen had a machine of more certainty than its predecessor, but it has taken all the ingenuity of man from the time of its invention in 1802 down to the present time to improve the iron press and the power-press, and to learn how to print wood-cuts or electrotypes made from wood-cuts in the same form with type, large and small, giving each of them the proper impression and bringing out the proper effect on other work. The machinery had to be created to do its part; the ink and the paper had to be made better, and the engraving of the wood-cuts to be done by artists of merit and carefully adapted to the exigencies of the printer. Really first-rate work must be executed on new type or electrotypes from new type, the former being preferable. There should be good lining in the type, the spacing should be regular and the divisions infrequent, while careful proof-reading is necessary. All of the kinds of type used in one work should be in harmony. Most elegant books are leaded and spaced rather openly. If the measure can be thirty ems or more in width it will greatly increase evenness in this respect. The plates should be well made, thick and stiff. If there are any imperfections which cannot be remedied a new plate should be obtained. Repairs to plates should be as infrequent and as careful as possible, as no substituted letters will look exactly the same as those in a well-made plate. In placing the plates or type on the press the squareness of the pages should be tested by a straight-edge and also by a notched-edge, as will be explained under IMPOSITION. Perfect register is essential to a good book. No page should be short and none long. This, of course, does not apply to chapter headings and endings and the like. Margins should be liberal. Theoretically, margins take up one-half of the sheet. Thus a page of a form in sixteens which contained a thousand ems in pica would be upon a leaf which was about 37 by 54 ems, or 6¼ by 9 inches, making a sheet 25 by 36. Such a leaf would contain two thousand ems. But on much work a larger margin is demanded. The inside has the least, the top the second, the outside considerably more than the top, and the bottom is still larger. It is on the two latter margins that great increase comes. The paper should be thick, but not too thick, as there is then great difficulty in folding it, and it is apt to break at the folds. To avoid these difficulties in folding it is well to print only four or eight pages in a form, work and turn. There is a more quick and certain register in this way. If cuts of any high quality are to be used the paper must be smooth; if fine process cuts, surfaced paper must be employed. The fine lines otherwise will not be displayed properly. Rough-edged, deckle-edged or ribbed paper cannot be used when the engravings are of any consequence. The press should not move rapidly, and a high grade of ink must be employed. For ordinary cut-work that which is worth from sixty cents to a dollar a pound will suffice, but for the best work this must be much exceeded. The rollers should be new and in good condition; this is imperative. The distribution should be ample. The more times the rollers pass over the surface of the type and the more the ink is distributed the better will be the effect. Engravings of the first quality need much ink and much impression in their blacks to do them justice. They should be full of color in that part. What degree of color there should be upon the type depends upon the taste of the house. Some prefer just that measure of ink which shall enable it to pass beyond the epithet of gray, while others desire as much as can be used without clogging or making the fine lines lose their distinctive character. Whatever it is, the deep shadow of an engraving, if it shall come next to the letter-press, must not be allowed to darken that portion in the least. The whole page and the whole form must preserve an equality of color, and not only one sheet, but the whole book. To insure this, as soon as the proper color has been reached, three or four sheets should be put away by the foreman so that comparison can be made day after day until the work is done. They should be compared in the best light which the pressroom affords.

The make-ready is spoken of under that title. Only a small portion, if any, of the type should be underlaid, as otherwise the whole form will dance. The overlays on fine work should be cut by skillful men, who should be allowed sufficient time to do the work properly. If it is a large form, with many cuts, two men can sometimes work advantageously together in cutting and pasting. When nearly done the results should be shown to the foreman, and when completely done, as is supposed, to the manager. An intelligent examination will sometimes reveal new possibilities. The feeding should be performed by experienced hands, and the delivery-board should be constantly watched. If much slow-drying ink is used offset sheets should be placed between the other sheets as they come from the press. The sheets should be hung up to dry and allowed enough time for it. Hot closets wrinkle the paper. Folding should be carefully done by hand. The binder prefers, when he is thinking solely of the goodness of his work, to have eight-page sections rather than larger signatures, as twelves, eighteens, twenty-fours, and the larger sizes have the inner pages thrown out of their true centre as compared with the others. Take a thirty-two page section. On the outside there are pages 1, 2, 31, 32; the next 3, 4, 29, 30; the third, 5, 6, 27, 28, and so on through the whole. If the book is trimmed on the outside the edge is alike, while the back of the last four pages folded in, the 14, 15, 16 and 17, has seven thicknesses of paper to separate it from the back. This is a very serious defect. For this reason binders prefer smaller signatures, but when this cannot be had sheets which divide up into two or more sections. Their work looks much more smooth. The best work in binding is sewed.

Such, in brief, are the more necessary things to be done to achieve fine work. Yet, through perverseness of the paper, rollers or ink, from some fatality with the press, or from some undefined cause, a book intended to be beautiful will fall short of its mark. Incessant vigilance is required. Every operation must be performed with the utmost care, and nothing can be taken for granted. It was only lately that in a large work executed in a good office in New York ten thousand copies of one form of a book were backed by a wrong form. The work was published in pamphlets of sixty or eighty pages, each separately numbered. A worked-off form by some accident was returned to or retained in the pressroom. Orders were to put on the pages which backed. The folios happened to fit; the sheet was shown to the foreman of the composing-room, who looked at the page numbers and saw that the first page read with the second. Ten thousand copies were printed, and the form was off before it was known that an error had been committed.

In fine work every defective sheet should be thrown away, or every sheet which becomes wrinkled in the bindery. The pages should be read for bad letters after every other reading has been completed. Wood-cuts should be carefully squared, and if high should be reduced. Brass rule should be avoided as far as possible.

Final (Sp.).—Ornamental tail-piece; end of chapter or any short page. This name is also given to the epilogue, index and table of errata of a work.

Fines.—In some English offices, and in one or two in this country, fines are imposed upon the workman for faults or errors committed. This is a mistaken policy. Good workmen do not voluntarily make errors, and those accidents which entail pecuniary loss must be accepted as necessary drawbacks in business. If done maliciously or with great carelessness it is better to get rid of the man who committed the error.

Fingers.—The grippers on a machine which hold the paper in printing.

Finiguerra, Tommaso, a Florentine goldsmith, who is believed to have invented the art of printing from copperplate. This happened at about the time of the introduction of typographic printing. Engraving, both incised and relief, had been carried to a high degree of excellence, and it only required an accident to show that the hollows, when filled with a pigment, would print off the design upon any smooth, light surface pressed against them. Finiguerra's claims to priority are disputed.

Finir (Fr.).—To finish.

Finis.—A Latin word used at the end of a book to signify its end. It is separated from the rest of the page by several blank lines and is generally in small capitals, the same usage being observed when the English equivalent—the end—is employed. Most books are printed now without using either of these forms, and the custom of placing a word at the end to denote the conclusion seems to be dying out.

Finisher.—One who completes or finishes the binding of books.

Finishing.—That part of the labors of a bookbinder which consists in embellishing the cover. The book is complete in other respects, but needs to have its title and other lettering added and the ornaments impressed. There are three parts to the outside of a cover, the recto or first cover, the verso or last cover, and the back between. Besides these there may be a doublé or ornamental worked inside cover. The ornamentation and lettering will be different with different materials, and with the most usual extra work may be executed in three ways. The first is when the tool makes an impression in gold; the second when it gives an impression only, which is known as antique work or blind tooling, and the third when an impression is given with ink by a printing-press or something like it. As the last is not hand work, many collectors would deny its claim to be a method of finishing. Inlaid work is sometimes done, gold, silver, mother-of-pearl, paintings or ornamental leather being set in, and ornamental bosses, hubs, clasps and bands and guards are occasionally added.

The tools used in finishing are numerous. They consist largely of little ornaments fixed at the end of a handle. Good designs in bookbinding are planned beforehand, and preferably should be drawn. The workman takes one of these little stamps or tools and impresses it by the weight of his hand upon the place where it is appropriate, and then changes it for another, which he stamps in another place, and so on, until the whole design is complete, the work perhaps taking weeks or months. His hand must give a perfectly uniform pressure, the metal must be of exactly the right temperature, the bottoms of the lines perfectly parallel with the surface, and the lines and ornaments joining completely, but without any appearance of stiffness or constraint. Different classes of ornaments and different methods of working have their appropriate names. To attain distinction in finishing a man must be an artist naturally, and have had much practice. In an elaborate pattern many thousand impressions are required. See Tooling.

Polishing-irons are needed of two kinds, one for the sides and another for the backs. A third is generally kept for polishing the board end papers when pasted down. It should be employed for this purpose only. A gold-rag is required to wipe off the surplus gold from the back or side of a book. More gold is laid on than is needed, it being in the form of a sheet, and only that part adheres firmly which has been pressed in by the tool. The leather should have a little oil well worked into it, so that when it has been wiped over the back or side the gold may adhere and remain upon it. This rag when full of gold will be of a dirty yellow, and may then be melted down by the gold refiners and the waste gold recovered. India-rubber is cut up very small and steeped in turpentine so as to render it as soft as possible. It is then used for clearing away any gold not taken off by the gold-rag. This should also be melted down. Sponges are required, both small and large. The larger are needed for paste-washing, and the smaller for glairing and sizing. Glair may be purchased already prepared, or it may be made from the white of egg, which must be very carefully beaten to a froth with an egg-whisk. In breaking the egg pains must be taken not to let any of the yolk get into the white. A little vinegar should be mixed with the white before beating up, and a drop of ammonia, a grain or two of common salt or a small piece of camphor will in some measure prevent it from turning putrid, as it is liable to do. Cotton is used for taking up the gold-leaf and pressing it firmly upon the leather. Varnish should always be used on that part where glair has been applied, after it has been polished, the object being to retain the brilliancy and to preserve the leather from the ravages of flies and other insects which are attracted by the leather and eat off the white of egg. The insects take away the surface of the leather and spoil the appearance of the books. A small pair of spring dividers, some lard, sweet-oil and a finishing-stove are necessary. A finishing-press is also requisite.

Blind tooling or antique finishing, the latter term being almost exclusively used in America by the trade, is that in which the indentations are not gilt. The lines thus made are darker than the rest of the surface, unless that should be very dark indeed. The usual custom is that the boards shall be very thick and beveled, and the edges either dull gilt or red, or gilt over red. This class of work is used extensively for religious books. A gold line introduced and intermixed with blind tooling gives a great relief to any variety of antique work. The same tools are employed, generally speaking, for gold and blind work, although there are finer employed on some branches of the former.

The method of working in antique is to take the tools, heated to the proper temperature, and work them on the damp leather a number of times, thus singeing or burning in the marks until the material has assumed the proper color. Care must be exercised to have the work executed with accuracy in location, so that there will be no irregularity of shape, and the tooling must be of the same depth and shade of color. In laying out the work a few lines are marked across the side as a guide for the tools and rolls. They form the ground plan. The whole side is dampened with a sponge, and after the depth of color is produced the cover is allowed to dry and then reworked to obtain the gloss.

Working in gold is much more complicated, as it is done upon more materials and as it requires the adhesion of the gold-leaf to the material. Different substances require different treatment. Leather is moistened, but paper, silk, satin and velvet must be treated dry. There are two kinds of leather, the porous and non-porous. Morocco is the principal of the non-porous leathers, with roan and all other imitation morocco. The porous varieties consist of calf of all kinds, russia and sheep. The non-porous leathers need only to be washed with thin paste-water or vinegar and glaired once; but if the glair is thin or weak it will be necessary to give them a second coat. The porous varieties must be paste-washed carefully, sized all over very evenly and then glaired once or twice. In beginning the learner makes his tooling blind. After this is done glair is penciled in. A leaf of gold is taken out and spread evenly on the gold-cushion; it is then cut as nearly to the various shapes and sizes of the tools as possible. One of the pieces of gold is taken up on a large pad of cotton, previously slightly greased by drawing it over the head, there being sufficient oleaginous matter in the hair to cause the gold to adhere. The gold-leaf is then laid gently but firmly on the impressed leather. The whole of the impression must be covered and the gold must not be broken. One of the tools, heated to such a degree that when a drop of water is applied it does not hiss, but dries instantly, is then worked exactly in the blind impressions. This is repeated to the whole of the tooling, and the overplus of gold is wiped off with the gold-rag. If the tool is used too hot the gold impressions will be dull; if too cold the gold will not adhere. Lettering is done in the same way. Brass type is preferable to leaden type, as it is less liable to melt and will last longer. It is not necessary to work in blind first; many experienced workmen use gold, but learners acquire the art more easily in this way.

When the side is elaborately ornamented the design should be drawn on paper. If any tools are to be used they should be held over the flame of gas. This will smoke them so that they will be reproduced in black on the paper. When the pattern is complete in every detail the four corners of the paper are tipped with a little paste, and the pattern is then worked through the paper upon the leather in blind. This being done completely the paper is taken off and placed on the other side, where it is worked the same way.

The inside of a book, when ornamented, is generally done before the outside. The ornamental inside is known as a doublé, and is wrought with a different color or design from the outside. Imitation morocco is generally used for publishers' bindings where books are in large numbers and small in price, and this finishing is all done in an embossing-press. Roan is commonly employed for circulating library work, and the ornamentation is as simple as possible.

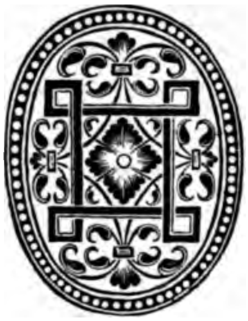
Inlaid work is most usual where one leather is placed inside of a rim, of greater or less magnitude, of a leather of another color. The most exact method of doing this is to lay the one color on the other, and then with a very sharp, thin knife cut directly through both. The part cut out of the lower one will then exactly fit into the place left vacant in the other. Another plan is to lay on a paste to protect the leather when it is desirable the color shall remain unchanged, and pour upon the unpasted leather some diluted acids which will destroy or alter the color. This must be done quickly, so as not to eat away the body, and the effect of the acid on the material must previously be ascertained, as so many dyes are employed, unknown as to their quality to the buyer, that the color or lack of color thus obtained may be very undesirable. Steel punches are also used to cut out the parts which are to be inlaid. They are the counterparts of the tools with the same figure. When the pieces are cut they are laid where they are required in depressions previously made by blind tooling. They must be well forced down, and after becoming dry the book is pressed between polished plates so that the laid-in leather can be thoroughly joined to the ground leather. Silver, gold and other materials each require different treatment.

Some books are polished. The polishing-iron is heated and rubbed or worked from side to side quickly, but firmly. The oil or grease applied to the cover previous to laying on the gold will be sufficient to allow the polisher to glide easily over the surface. The heat must be sufficient to give a polish; but if the iron is too hot it will cause the glair to turn white. When complete plates of japanned tin are placed between the book and the millboards. When pressed sufficiently the book is taken out and if the sides are polished they are varnished. This is done with a ball of cotton. The varnish being completely dry, the book must again be pressed.

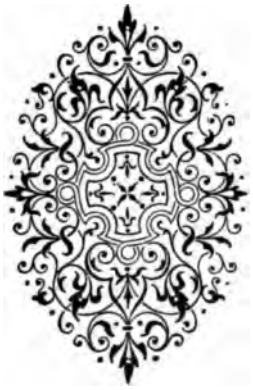
Graining is executed by pressing the leather against wooden, brass or copper plates upon which are engraved various minute patterns; it may be done either before the leather is used at all or when the book is complete. In the latter case it has the advantage of hiding any finger marks which may accidentally be on the calf, and also partly conceals any imperfection in the leather.

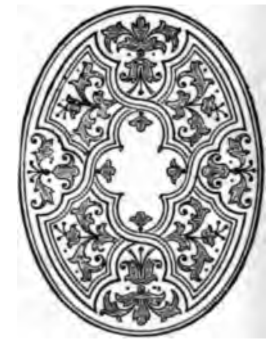
Dry preparations are used with velvet and silk. The white of eggs, exposed to the air and a little heat, not exceeding that of a hot day in summer, is dried and powdered. The powder is put into a bottle and three or four thicknesses of fine muslin are tied over the mouth. By shaking the bottle the powder will fall through in a fine shower, but should fall only on the part to be gilt. The gold is cut into strips, taken upon the tool and worked rather hot. The overplus of the powder can be brushed away when the finishing has been completed. Velvet is very seldom worked more than to put on a title. Silk can receive more elaborate treatment. Glair can be used, partly evaporated, great care being taken that it shall not spread. Such work is also done in the embossing-press with brass stamps.

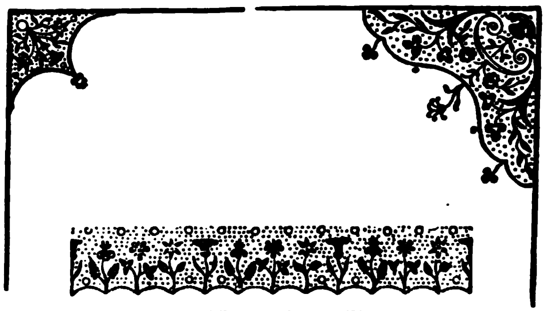
When vellum is used for a cover it requires different treatment from that employed upon other materials. It is carefully washed with a soft sponge and pure water to clean off any dirt. This, however, should be done no further than is necessary, as thus the surface is washed off also, vellum of the finer kinds being artificially faced. The flesh side is the inner side of the cover. The lines should first be worked blind and then glair placed upon them, but nowhere else, as it will leave its mark, discoloring the material. When dry the gold is laid on and the tool worked in. The tools must be only moderately warm; if too hot they would go through to the millboard, leaving their mark as if cut through with a knife. When a title-piece of leather is to be put on the vellum is scraped so as to render it as rough and fibrous as possible. As vellum is greasy, it is hard to make the title-piece stick otherwise. Little tooling is done upon this material as a rule. Parchment follows like methods.

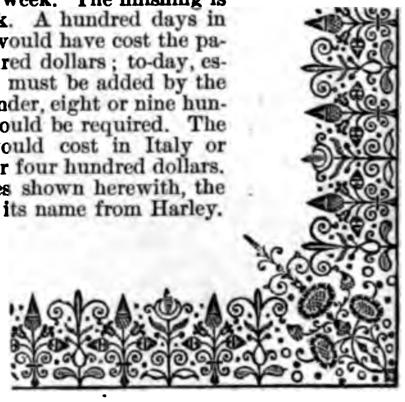

MONASTIC TOOLING.

The various schools of finishing are known by different names. Masters of the art invented new tools, but the distinction between them was rather from their massing or assemblage and the skill shown in their handling than from the tools themselves, which were small and unobtrusive. The earliest of these styles was that known as the monastic. In this the lines were solid and firm, joining frequently with stiffness, and requiring the use of color or of gold to give the requisite form to please the eye. The Venetian style followed. Later a more delicate shape was introduced, largely under the patronage of Grolier. His designs, says Zaehnsdorf, from whom this work has drawn largely in relation to binding, consisted of bold gold lines arranged geometrically with great accuracy, crossing one another and intermixed with small leaves or sprays. These were in outlines shaded or filled up with closely worked cross-lines. Not, however, satisfied with these simple traceries, he embellished them still more by staining or painting them black, green, red and silver, so that they formed bands interlacing each other in a most graceful manner. These bindings are greatly prized by collectors. A club which has been formed in New York bears his name, and everywhere the work done for him is acknowledged worthy of the highest praise. Maioli was another very great name. In the seventeenth century the names of Du Seuil and Le Gascon became noted as those of binders of the first class. Derome, Payne and others afterwards did much fine work. Since their day there has been a constant succession of able and painstaking binders in France, Germany and England, many of much distinction. Owing, however, to the fact that binding is now carried on upon a very large scale, the work being divided and subdivided, no one workman is able to compass all branches, as was possible in the sixteenth and seventeenth centuries. The binder is employed on work which must be hurried through, and the patron cannot afford to have as many days' labor expended upon a cover as he could a hundred years ago. In France in 1750 a master bookbinder, working in his own small shop, could afford to sell a day's work for a dollar; he gave his journeyman no more than half of that. To-day the journeyman in New York capable of doing first-rate finishing work fit to exhibit at the Grolier Club must be paid from thirty to forty dollars a week. The finishing is still hand-work. A hundred days in former times would have cost the patron one hundred dollars; to-day, estimating what must be added by the master bookbinder, eight or nine hundred dollars would be required. The same work would cost in Italy or France three or four hundred dollars.


VENETIAN TOOLING.

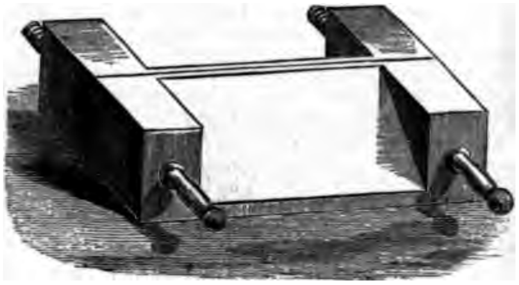

GROLIER TOOLING.


ROGER PAYNE TOOLING.


HARLEIAN TOOLING.

Of the styles shown herewith, the Harleian took its name from Harley, Earl of Oxford. It was on red morocco, with a broad-tooled border and centre panels. Payne's style was that of a combination of small tools. Many distinguished binders have appeared since the beginning of the present century, but conditions are no longer favorable for the cultivation of individual skill. In only two respects are we superior to our predecessors. An art education is much more common, and individual fortunes have reached a magnitude for which there are no former precedents. It is possible that binding may be taken up as one of the amusements of the rich, as the gathering of bric-à-brac and of paintings has been, and that the collection of a library of well-bound books may become one of the marks by which the rich who understand how their means should properly and nobly be spent can be distinguished from others who have not an equal measure of taste and education. But more is to be expected from the general increase of taste in the community. It is impossible that the constant instruction with pen, pencil, graver and brush shall fail to instruct the eyes in beauty of form and color, and at the Grolier Club and in some private libraries object lessons, showing the best that has so far been accomplished by the masters of bookbinding, are continually set before tyros. As soon as a demand begins for superior work men will be found to satisfy it. See under TOOLING.

Finishing-Press.—A small press which holds the book while the finisher is working upon it.



FINISHING-PRESS.

Finishing-Stove.—A small furnace used for heating the tools of bookbinders when necessary.

Finnish.—This language is set with the German character, but learned works are occasionally executed in Roman. The entire number of works published in Finnish from 1544 down to 1885 amounted to 3,171 books, sixty-two musical compositions and nineteen maps. One-third of the whole was upon theology.

Fire-Eater.—An old term in England for a rapid setter of type. In this country the words were never thus used.

Firefly Press.—A job press invented by George P. Gordon, which printed cards from cardboards fed to it in long strips. A speed of from eight to ten thousand an hour was attained.

Firnis (Ger.).—Varnish.

Firm, Joseph L., an inventor of printing-presses, was born on March 19, 1837, at Williamsburgh, N. Y. He was apprenticed to Harper & Brothers in New York city, and was in their employment when their old buildings burned down in 1853, prior to the erection of the present structure. He was at work on the third floor, and escaped with the greatest difficulty. In 1859 he was engaged by Frank Leslie, becoming foreman and introducing there many improvements in pressroom machinery. He is the inventor of a set-off device for illustrated newspapers and a web press. Both these are in use in several places.

Firm Press.—A system of rotary presses devised by Joseph L. Firm of New York, of two kinds. In the one a large type-revolving machine receives and prints electrotypes of type and wood-cuts, the paper being naturally heavily charged with ink in the dark parts. After the sheet is finished on one side it passes under a composition roller, which takes away the superfluous ink and deposits it on a polished steel roller, from which it is immediately removed by wiping. It is claimed that by this process the danger of off-set is entirely removed. The second side is then printed. The other kind of Firm presses is intended for printing and folding daily newspapers at great speed, and no part is higher than a man can reach.

First.—In Moxon's and Smith's time the pressman who had wrought longest at any press. The other was known as second. The first had rather the preference in choosing what was to be done, and was held to more responsibility. This custom died out a hundred years ago. Then the pressmen were made alike responsible.

First Form.—The form which contains the first page of the body of a work; with newspapers, that side which goes first to press.

First Page.—In imposing, the first page of a regular form is always at the left-hand side of the make-up, its bottom being towards him.

First Proof.—The proof first taken from the type, sometimes incorrectly called a foul proof.

First Side.—In newspapers, that half which is first printed.

First State.—A print from an engraving which is afterwards to be altered in some respect, although the change may be very trifling. If, after the engraving is done, no variation is made, there is no " state " to it. All copies are alike. The first changes executed afterwards make the print taken from the plate in its second state, and the next is in its third state, and so on. The first state may be, and probably is, more valuable than a succeeding proof, but there may be some beauty or conceit in the latter, or it may be so much scarcer, as to make it worth much more than that which preceded it.

Fish, William S., a printer of Indianapolis, was born in Jennings County, Ind., on September 11, 1845, and entered the printing-office of Slater & Shipp, at Franklin, in that State, in 1859. Twelve months later he removed to Indianapolis, and for nine years was in the book and job department of the Journal. He was then employed on the News for nearly a year, but in November, 1869, entered the Sentinel office. In a few weeks he was made foreman of the job department, and later on became superintendent. In June, 1886, a joint-stock company was formed under the title of the Sentinel Printing Company, which purchased the book and job department of the newspaper of that name. Of this he was elected president. He was chosen president of the Indianapolis Typothetæ on its formation, and was a delegate to the convention of the United Typothetæ at Cincinnati in 1891.

WILLIAM S. FISH.

Fisher, Henry, a distinguished English printer, bookseller and publisher, who carried on business for many years at Liverpool. His specialty was printing in numbers or serial parts. He was apprenticed as a printer, was taken into partnership by his employer, and when his subsequent partners retired he became the sole owner of the largest printing-office eighty years ago in England. In 1818 the establishment was destroyed by fire, and he removed to London, where he died in June, 1837.

Fist.—An expression for an index mark, sometimes called mutton-fist in England, and made thus: ☞. It is also called a hand in America. It serves to call attention to the words following.

Flache (Ger.).—The face of a letter.

Flange.—The back of a stick, through which the screw holes pass.

Flaring a Form.—Formerly, when working by candle-light melted tallow would drip upon the pages. To get rid of it the compositor lighted a piece of paper and put it on the grease to melt it. He then brushed it away with the letter-brush. This is of course obsolete, with all other kinds of flaring.

Flaring Balls.—To burn a piece of paper against the face of balls in somewhat the same manner that a fowl is singed, only not so closely. This was done to drive out the superfluous moisture. After rollers came in they also were flared to close the cracks which came in making or in use.

Flat.—An expression used to indicate want of variety in an illustration owing to lack of light and shade. In speaking of types it denotes width of body marks and hair-lines, so that a generous quantity of ink can be deposited.

Flat Cap.—A size of writing-paper measuring 14 by 17 inches. It is sometimes also made as a book-paper.

Flat Paper.—Unfolded paper in sheets. The term is usually applied to all kinds of writing-papers which are put up flat at the mills. A large proportion of book and other papers is at present also put up flat, either in cases or frames. The use of folded papers imposes much labor in folding, unfolding and repacking, most of which can be avoided by the use of flat paper.

Flat Pull or **Impression.**—A simple proof without underlaying or overlaying.

Flat Tint Plates.—A typographic plate used in printing colors or backgrounds. It consists of very fine lines, with little variety, and is more generally known as a tint plate.

Flats.—Unfolded paper, properly flat papers.

Fleet, Thomas, a printer of Boston, who learned his trade in England. He arrived in Boston about 1712, and for several years printed pamphlets for booksellers, small books for children, and ballads. He had several negroes, one of whom worked at both press and case, and was an ingenious man, who cut on wooden blocks all of the pictures which decorated the ballads and small books of his master. Fleet acted as auctioneer as well as printer. In 1733 he published the Rehearsal, a weekly newspaper, and continued it under different names for many years. He indulged in a great many facetious observations in it. He continued it until his death in 1758, when he was seventy-three, and his sons continued it after him. He left a handsome competence.

Fleurons (Fr.).—Flowers or borders.

Flexible Boards.—In binding, when the stiffening in the covers is very little and they bend easily.

Flexible Not to Show.—Where a book is sewed with cords not imbedded in grooves at the back, but passing entirely outside of the sheets. A thin cord is taken doubled for each band, and these cords are beaten into the back in forwarding, so that the cover may be pasted directly against it, there being no appearance of bands.

Fliegenköpfe (Ger.).—Turned letters; berichtigen Fliegenköpfe, to rectify turned letters.

Flimsy.—Thin paper, such as bank-paper, telegraph forms, &c., is thus termed in printers' and newspaper slang in England. In America the expression is sometimes used in connection with tissue-paper or manifold copy.

Floating Accents.—Marks to be used above and below letters, so as to make them appear like accented letters.—*Southward.* This term is not known here, but the custom is. These accents are cast large enough for canon, and can be made for wood type.

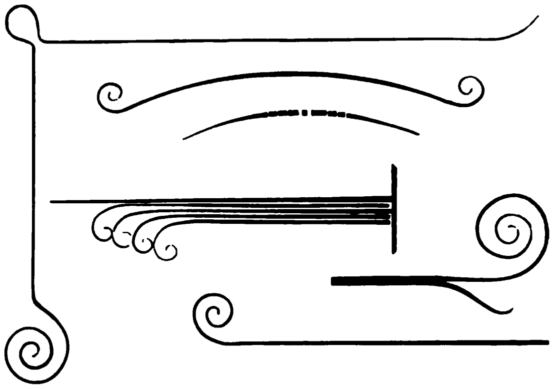
Flock Printing.—A method of printing with varnish to which small particles of wool or silk are afterwards made to adhere. This has a peculiarly rich, velvety appearance, but has very much gone out of vogue. As fast as the sheets are printed the flock is thrown on with the fingers; the sheet is then tilted and tossed until every part has received its proportion of flock, when the remainder is shaken off. It is well to have no fine lines in the form, the best work being executed on engraved blocks. There are a number of colors to flock, and they can be used singly, mixed or in succession. If bronze is desired at the bottom of the lines, apply that first with a camel's-hair brush; dry color, when desired, is applied next, frosting third and flock the last. Rollers and form are likely to clog, and should frequently be washed.

Flong.—The prepared paper used for making the molds for casting stereotypes by the paper process.

Floor Pi.—Letters picked up from the floor or sweepings of a composing-room. Letters on the floor indicate ill-trained compositors, as type is nearly ruined by being allowed to fall thus. It is the custom in most offices to pick up the types and place them upon a piece of paper in one of the boxes of a case or in the stick, and to insist upon distributing them very soon after.

Florida.—Printing has been carried on in Florida for more than sixty years, the Floridian, of Tallahassee, having been founded in 1828. The largest places for printing are Tallahassee, the State capital; Jacksonville and Gainesville. There are twelve dailies, ninety-six weeklies and thirteen other periodicals in Florida.

Flourishes.—Curved lines, made by the type-founders for ornament. They are in many different shapes, either in type metal or in brass, but the latter is usually understood. The taste of the present day is against those thus furnished, as better and freer lines can be made by expert compositors with brass rule and a few tools.



SPECIMENS OF BRASS FLOURISHES.

Flowers.—Floral or conventional ornaments used for borders. In course of time the term was applied to all little cuts furnished by type-founders in quantities, and capable of being used in a decorative way. This is the older English term, the word border having been used very rarely or not at all until within the last seventy years. Stower in 1808 has twenty-eight pages devoted to flowers, from four-line pica down to pearl. Among them are ships, check ends, houses, boats, crowns and death's heads, besides what might strictly be termed borders. With these it was the custom to build up in an architectural way a design for a whole ornamental page, appearing to our present taste singularly formal.

Fly.—The person who takes the sheets away from the press, and also the mechanical device which does the same thing. In the earliest power-presses there was no delivery apparatus, and after the sheet had been printed and began to be disengaged from the cylinder it would either fall on a heap at the end or be caught and carried around again. Flies, as the boys who did this work were called, were a necessity. The word itself in this sense was employed as far back as the time of Moxon. In this case the fly was the pressman who took the sheet from the tympan after the press had completed printing. The pressman ran the carriage out as far as it would go, threw up the tympan and frisket, and turned round to get a fresh sheet. While he was doing this the fly took off the signature already worked. The common form of the mechanical fly or flyer is that of a number of sticks or fingers secured at one end to an axis. When the sheet is ready for delivery the end of the fly is nearly against the cylinder. The sheet advances and slides down the sticks until it reaches the bottom, when the axis of the fly is moved a large part of a circle, the arms going with it and depositing the sheet upon the delivery board. The fly then returns for the next sheet. The word fly is also used as a verb.

Fly-Leaf.—A blank leaf at the beginning or end of a book. Usually one or more fly-leaves are put in at each end by the binder, but it will occasionally happen that there are one or two blank leaves at the end of the last sheet printed.

Fly-Title.—This designation is sometimes applied in England to the half-title in front of the general title or to that which divides sections of a work. As applied to the title in advance of the general title this term is incorrectly used, the true designation being bastard title. The other titles mentioned have in America no distinctive name.

Flyer.—The mechanical fly of a press.

Flying a Frisket.—The process of turning down the frisket of the hand-press at the same time that the tympan is put into motion. This is a very difficult operation to perform, and yet very necessary if celerity is an object. If the tympan is moved too far over at the time that the top of the frisket descends to its utmost the face of the form will be scraped by the end of the latter.

Foglio (Ital.).—A sheet upon which printing is done.

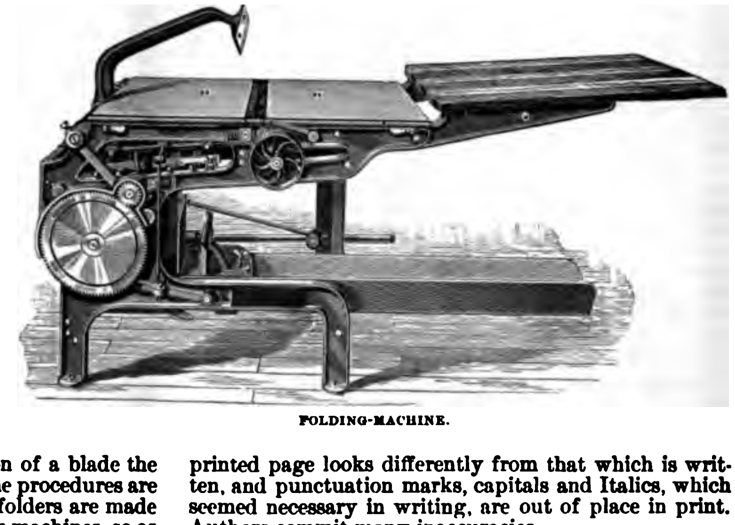
Foglio di Maestra (Ital.).—The first printed sheet from a form.

Folded Paper.—Paper which is done up in reams folded in half or quired—not flat.

Folder.—1. A piece of ivory held in the hands of the person who is folding paper, and used for the purpose of making the folds perfectly square and accurate. 2. The person who folds. 3. A sheet so printed that pages follow each other consecutively on the same side of the sheet. Thus, on one side of a long folder the pages may be 1, 2, 3, 4, 5, 6, 7 and 8, while on the other side they would be 9, 10, 11, 12, 13, 14, 15 and 16. Consequently, 9 might back on 8, 10 on 7, 11 on 6, and so on; or they might run so that 9 would back on 1, 10 on 2, 11 on 3, and continuing thus until the end was reached. Folders are much used by railroad companies and real-estate agents. 4. A folding-machine.

Folding-Chases.—Chases which match together, and are used for newspaper work. They are thin on two sides, if four are to be worked together, and on one side if two only are needed. The term is not used in the United States.

Folding-Machine. — A machine which takes the sheet after it leaves the press and folds it. It depends upon creasing the sheet in the middle by the action of a descending blade, which forces the paper through an aperture in the table; the sheet is then caught by a pair of rollers, which press it and carry it through, completing the first fold; this is repeated on the second, third and fourth folds until all are done. The girl who attends on the machine feeds the sheet to a gauge or gauges, as on a press, and the blade strikes it exactly on the centre. A second kind of folding-machine is attached to daily newspaper presses, the sheet in some making a turn by running between guides, so that without the intervention of a blade the first fold is made. From this time on the procedures are much as in the other machines. Many folders are made attachable to double and single cylinder machines, so as to require no feeding. Some fold, paste, trim and cover by having a separate feed for the cover.



FOLDING-MACHINE.

Upon folding-machines it often happens that an imposition out of the ordinary is necessary. The machine folds best the less there is turning or changing of the sheet, and if fed with paper printed in the ordinary manner the headings will come wrong. It is therefore necessary to impose the form in other ways. The speed of a folding-machine is far greater than that of a hand folder.

Folding-Stick.—The bone or ivory tool used in folding.

Foliación (Sp.).—Paging.

Foliiren (Ger.).—Numbering the leaves of a book instead of the pages.—*Caspar.*

Folio.—1. A book printed on paper which has been folded only once, so that each sheet consists of two leaves or four pages. 2. The running numbers of the pages of a work. 3. A leaf containing a certain number of words, hence a certain number of words in writing. In England this is in law proceedings seventy-two and in Chancery ninety; in New York one hundred words are required.

Folio Post.—A size of paper, 17 by 22 inches. It is found in a great variety of weights and sizes, white and blue. The American is flat, two reams to the bundle; the French is obtained in one-ream wrappers. In book-papers it is used for pamphlets.

Folletin (Sp.).—The lower portion of the page of most foreign newspapers, in which is printed a story, sometimes in pages, to facilitate cutting out and preserving. The custom is now being imitated in some of our leading dailies. See FEUILLETON, the French word from which this is derived.

Folleto (Sp.).—Pamphlet.

Follow.—To see that sheets in a gathered book are in sequence. Also used in other departments; by a compositor or a proof-reader to see that copy follows, or by a pressman in perfecting to see that his folios follow.

Follow Copy.—A compositor is frequently told to "follow his copy, though it go out of the window." Practically, however, copy is never followed, except in that very limited class of writings in which it is designed to hold a person up to contempt by showing his ignorance and inaccuracies, and in the other limited class where ancient manuscripts are copied literally. In all other cases some latitude is taken, and even the authors who are most solicitous about having their copy followed would very frequently be angry if this were done. The printed page looks differently from that which is written, and punctuation marks, capitals and Italics, which seemed necessary in writing, are out of place in print. Authors commit many inaccuracies.

Over thirty years ago a school-teacher in New York was criticised by a reporter of the Tribune for something wrong in a school examination. He wrote a letter defending himself, and that letter appeared in the newspaper with three or four errors, which the teacher had committed. It was hastily written. Charles A. Dana, then managing editor of that journal, desired editorially to know how such an ignorant man as the letter-writer seemed to be could fill such an important position as to be at the head of a school. In the answer which was made by the teacher he pointed out that, while his manuscript was published without giving him a chance for revision, Mr. Dana's manuscript was first corrected by the compositor, then by the proof-reader and then by the editor himself, and it ought therefore to be accurate. This is true. Flaws can often be picked by unlearned compositors in the manuscripts of the most learned men. Edward Everett's copy was on one occasion known to the writer altered, and rightly, too, by a compositor who was not a highly educated man. Yet Mr. Everett was one of the most accurate writers in America and always took great pains with his copy.

If we only consider the question of spelling we can see that it is impossible ever to acquire knowledge of the orthography of all words. Forty or fifty thousand common words can be learned by a man with a good memory, or perhaps even double this, but the other hundred thousand cannot be committed to memory. Authors in books should be followed closely, and no changes in words should be made except for positive errors. Thus if a man should write that Thomas Jefferson was the fifth President of the United States it might not be an error, although he was preceded only by Adams and Washington, for Washington had two terms, Adams one, and Jefferson two. He might, therefore, claim to be the fifth President, as he was the fourth, for a President is elected every four years; but the proof-reader could properly change "second President," if that had been written, to third President.

In many cases the author may be accurate, although the reader and compositor may think him wrong. Most authors look to the printers to establish a uniform rule of capitalizing, punctuating, hyphenizing and dividing. No one would be more angry than an author who found in his book some error which the reader had passed by, although he believed it an error. He does not, however, think it right, nor does a printer of accomplishments, to change whilst to while, amongst to among, reliable to trustworthy, or any of the other improvements which may suggest themselves to the brain of the compositor or the reader. There doubtless was never a quantity of copy in which some improvement could not be made. Rogers, the banker poet, would not allow that there were half a dozen perfect lines in Shakespeare, and it is well known that Cobbett's examples of ungrammatical language in his English grammar were derived from the king's speeches, written for him by Walpole, the elder and the younger Pitt, Lord Liverpool and others who had acquired excellent educations in the English public schools, and had had much practice as speakers. Strictly correct writing cannot be found in books or pamphlets of any length; the sentences will not all parse, the thought is frequently expressed in an awkward way, and an occasional misuse in meaning is sure to be discovered. But the printing-office is not to correct these. It is its business to put the words in type, free them from typographical errors, query the worst expressions to the author and be content. It cannot act as either censor or author.

Fond Sale (Fr., dirty bottom).—In prints, a smearing occasioned by the plate not having been burnished sufficiently. The rough parts retain their portions of the ink, which print off with the rest, and show like a dirty wash or smearing. It is an evidence of an early impression, as after a time the plate gets smooth and this no longer shows.

Fonderie (Fr.).—A foundry; fonderie des caractères, a letter or type foundry.

Fondeur (Fr.).—A founder; fondeur des caractères, a type-founder.

Fondo (Sp.).—Tint ground; the type or block as well as the impression.

Fondo, Bianco di (Ital.).—The lower outside margin of the sheet.

Font.—A quantity of type of the same size and kind used together. It was originally all that was cast at one time, but in practice it has come to mean all that a printer has of a certain type, matching exactly and with the same nick; it embraces the whole of this quantity. In English books it is generally spelled fount. A complete font of letter is embraced under ten heads, containing the following sorts:

CAPITALS.

A B C D E F G H I J K L M N O P Q R S T U
V W X Y Z Æ Œ &.

SMALL CAPITALS.

A B C D E F G H I J K L M N O P Q R S T U V W X
Y Z Æ Œ &.

LOWER CASE.

a b c d e f g h i j k l m n o p q r s t u v w x y z
æ œ fi ff fl ffi ffl.

FIGURES.

1 2 3 4 5 6 7 8 9 0.

POINTS AND MARKS.

, ; : . ? ! - ' ( ) [ ] * † ‡ § ‖ ¶ – — —— ———
⌒ ‿ ⌒ ⏟ ⏟ $ £ ₱ @ ℔ ☞.

FRACTIONS.

⅛ ⅜ ⅝ ⅞ ¼ ½ ¾ ⅓ ⅔.

Four kinds of spaces.
Em and en quadrats.
Two and three em quadrats.
Accents.

In addition to all these, Italic is required, with the same sorts nearly. Sometimes small capitals of Italic are made. Job fonts dispense with the least used sorts. Newspaper fonts have an undue proportion of capitals and figures.

Each font should have a nick distinct from that of any other of the same size, and if possible from that of any of the sizes next above and next below it, as careless compositors often throw bourgeois into a brevier case, and brevier into a minion case if the nick is alike. When first laid it is frequently uneven and will require sorts to be added. Among these will nearly always be included thick and thin spaces and lower-case f's. After a time sorts cannot be added as before, for the new letters are high and will punch into the paper or else be crushed on the press. When the work is not particular this addition will make no great difference. In some large New York offices the font used on law work is continually sorted up, and bad letters are rejected at the same time, so that the font will never wear out.

Font-Case Rack.—Large racks or cabinets made specially for holding sort cases.

Font Cases.—Cases to hold reserve sorts. Their boxes are much larger than those of other cases.

Fonte (Fr.).—Font or fount; a casting.

Foolscap.—In England, a size of printing-paper, 17 by 13½ inches; writing-paper, 16½ by 13¼ inches. In America it only exists as a writing-paper, the size being 12½ by 16 inches. The name of foolscap was originally derived from its watermark.

Foong-Taon, a Chinese public official who is said to have invented printing in the tenth century. He dampened a piece of paper and applied it to a block of wood which had previously been inked. The requisite result was attained, and the Chinese have ever since followed this method.

Foot of a Letter.—The bottom of the shank of a type; usually grooved.

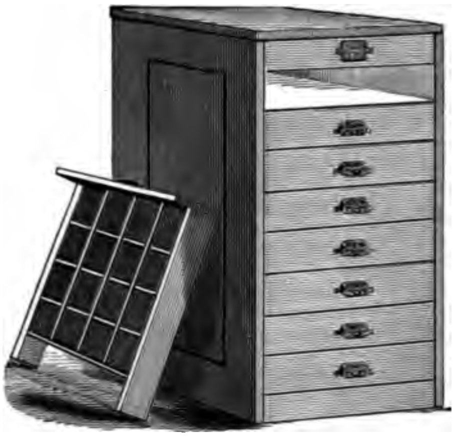
Foot of the Page.—The bottom or lower portion of a page.

Foot of a Type.—The very bottom of a type, opposed to the face. It is sometimes called feet, because it is divided in two by a groove.

Foot-Line.—The bottom line in a page. It is a blank and does not appear in printing, except when it bears the signature. It is nearly always a line of quadrats, but sometimes is a slug of the exact thickness of a line.

Foot-Stop.—The piece against which the hand pressman braces his foot when he is pulling.

Footsticks.—Sloping pieces of wood or metal which rest with one side against a page of type, the beveled side being outward. Between this and the chase the quoins which lock up the form are placed. In job-work of small size, and usually in book offices, the footsticks are of wood, but in newspapers nearly always of iron. They should be a little shorter than the page, so that they cannot bind against the sidestick, which ought to extend a little lower than the end of the page.



FONT-CASE CABINET.

For Press.—These words, or "Press" simply, are written upon a revised proof ready to be printed from. This is the last proof with which the proof-reader has anything to do.

Force de Corps (Fr.).—Size of body.

Force, Peter, annalist and printer of Congress, learned his trade in New York with William A. Davis, and afterwards, when the latter removed to Washington as Congressional printer, accompanied him as foreman. He was born in New Jersey in 1790, and among his feats as an apprentice was adding several sonorous Dutch names to those mentioned by Washington Irving in his Knickerbocker's History of New York, upon the first edition of which Force was a compositor. Mr. Irving was much pleased with the additions and incorporated them in the text. Force became president of the Typographical Society in New York when only twenty-two years of age. In 1814 he sailed in a sloop for Washington with the Congressional printing-office, which was then very small, four single-pull, wooden hand-presses being sufficient to do all of the work. He early attracted the attention of the prominent men of that day, and remained a leading character in Washington his whole life. He was taken into partnership by Mr. Davis, and when the latter withdrew had other partners. His, however, was always the dominating mind. In 1823 he published a paper in the interest of John Quincy Adams. From 1836 to 1840 he was mayor of Washington, and was afterwards president of the National Institute for the Promotion of Science. His claims, however, on posterity rest upon his assiduous care in collecting the documents upon which American history is founded, and upon his publication of the American Archives, a selection of the most noteworthy papers which bear relation to the life of the United States. This extended to nine quarto volumes and was prepared with great pains. After the ninth volume had been issued, however, the officials upon whom the law imposed the necessity of giving an imprimatur would not read the manuscripts, and the work stopped while Mr. Force was still in the possession of energy and had many important documents yet to publish. He continued his efforts to have subsequent officers reverse this action, but it was unavailing, and with a sad heart he was compelled to give up his cherished object. His library was the largest collection of Americana ever gathered by a private person, and was finally purchased by Congress, forming the most valuable portion of that great assemblage of books. He was a kindly, large-hearted man and felt his disappointment deeply. He died on January 23, 1868.

Fore-Edge.—The edge of a book which is farthest away from the back.

Foreign Languages.—Composition in foreign languages is more difficult for a compositor to execute than work in his own tongue, and there are often difficulties to contend with in the way of sorts. Under each of the more prominent languages may be found rules for their composition. There are three classes in respect to difficulty and cost of printing. One uses the Roman character, as do French, Spanish and Italian; this class takes only a slight advance. Another class consists of languages with different type, but still much used in literature, such as German and Greek. A greater advance is required on them on account of the necessity of providing characters other than Roman, and there are many other difficulties in Greek. The third class is like Arabic, Hebrew, Sanskrit and other tongues using characters widely differing from all of these, and on which no one is ever employed long enough to become very proficient. Such works can only be done on time, and should be charged for as time, with the necessary printer's allowance for rent, fire, wear and tear, superintendence, proof-reading and make-up.

It is usual where a few words in foreign characters occur here and there to allow the compositor by the piece something extra for his trouble. For instance, Hebrew words with kerned vowels are charged for by the employer in New York at eight cents apiece; not having accents, six cents. A part of this is given to the workman. German executed in an office without particular facilities ought to be worth 15 per cent. extra for reprint, but in manuscript 20 per cent. more. It is then probable that money will be lost on it. Greek is worth about double, and this should be charged for matter not exceeding a single sheet. Offices fitted for this work may, however, do printing in it for 10 or 15 per cent. less. Portuguese, Spanish, Italian, French and Dutch should be charged for at least 10 per cent. more on reprint and 15 per cent. more on manuscript. Welsh should take as much as German. It is impossible for those who do not know Welsh to read proofs of it in any other way than by spelling out every word. This is also the case with Hungarian, Polish, Bohemian and many other languages. In all estimates upon work in foreign tongues there must be an unusual allowance on account of the difficulty of reading proofs. It does not often pay for an office to do work in foreign languages; the drawbacks are too many. See under the heading of each language, and also under the head of LANGUAGES.

Forel.—An extra cover for a book, designed to protect it. Also spelt forrill.

Foreman.—The executive officer of a printing-office. In England he is generally known as an overseer, but on newspapers there he is the printer. Much depends upon his skill and executive ability. In offices of any considerable size there are separate foremen for the composing-room, pressroom and bindery, and in very large offices this may again be subdivided into foremen for the book-room, job-room, Adams press room, newspaper presses, book pressroom, edition bindery and job bindery. In the Congressional Printing-Office there are half a dozen foremen in the various departments of the composing-room. In such mammoth establishments much system is required to avoid friction. The foreman of a printing-office or of a department of it should himself have been bred to the business. He must not only know when the work is well done, but be able to show others how to do it. This involves familiarity with the smallest details. In the composing-room he receives the copy, gives it to his men with detailed instructions, examines its progress and determines whether it is properly executed. If the office is busy the stones must be kept free from unimportant work, so that the important forms can be made ready, thus keeping the presses in operation. It is the business of every foreman to see that his men and boys do a good day's work. He hires and discharges, and is held responsible for the efficiency of his department. The foreman of a pressroom assigns his men to their presses, determines the forms they shall put on, watches the impression and keeps account of all that is done. In each place books must be kept, showing the time of the men; or, in the composing-room, the quantity of type set. To do this the foreman must be on hand when the office is opened in the morning, and remain there until it is closed at night. He keeps a record of the work performed, so that it can be referred to instantly. He is responsible for the apprentices or boys, for waste and for discipline. A large part of the success of any establishment depends upon the foremen.

Stower lays down in his book, published in 1808, a number of valuable rules for foremen, which, in a modernized form, and adapted to the material and usage of to-day, are given herewith. It is his business in a small office to open and close the place, and to see that lights are out and the fires properly and securely cared for. In a larger printing-house there is a watchman or porter who attends to this work. He should be well acquainted with the exact state of every work in hand. No man should be allowed to hold too large a take of copy, as that impedes the make-up. He should see that forms are imposed as soon as possible after composition is completed, that there may be a return of letter. Occasionally he may be obliged to read proofs, and he should be sufficiently educated to do this. He keeps extra sorts and leads under his own supervision, and if it is thought necessary to lock them up he is the custodian of the keys. It is his duty to examine the first sheet of a work after it has gone to press, to see that the press revise is corrected and that it is properly imposed for folding. The sheet is brought to him by the pressman.

A very important part of the foreman's duty is the preparation of the pay-roll and the determination of the compensation of the other workmen. It should be his determination to keep his expenses down as far as possible, while at the same time giving the greatest facilities to the work and paying enough to the men to get a good class of help. In New York, for instance, weekly hands in a composing-room ask eighteen dollars a week. Some of these can do nearly or quite twice as much as others. It is therefore good policy to give superior men nineteen, twenty or twenty-one dollars, and to get rid of those whose performance is small, although good. When both piece and weekly compositors are engaged it is frequently economical to put a new work in the hands of one or the other of these, as a greater quantity of work can thereby be executed at a given price. The charges to customers on time-work should be rigidly examined, and no more should be charged for than has actually been spent, while at the same time everything should be entered, proof-reading, superintendence and other incidental charges. It is of importance to see that the men are present at the beginning of work and ready to proceed, and that they do not stop before the hour of intermission. This can more easily be done in a composing-room than in a pressroom, as the machines must be cared for. Yet here, by having fires kindled early and presses put into condition before 7 o'clock, the work can begin almost promptly on the stroke. At night, instead of stopping at a quarter of 6 o'clock, or ten minutes before, the machines can run until the hour ends, afterwards being cared for by a man who remains for that purpose.

Forestay.—The parts of the extreme end of the wooden hand-press supporting the carriage, and in consequence the bed, frisket and tympan.

Forging.—A printer never should allow himself to reprint for any one whom he does not know anything having a money value, such as tickets of admission, evidences of indebtedness, restaurant checks, note-heads, and so on, which may be used by sharpers to deceive with. Every few years some printers in our Eastern cities get into trouble by printing securities for South American or Central American governments. Those who thus bring in the jobs frequently have no right to do so. The securities dealt in on the New York Stock Exchange are executed upon steel, and their evidences of indebtedness must be well engraved and well printed. The committee on this subject has frequently refused to list those kinds of securities which do not have their paper representatives very carefully executed. Among the contrivances to prevent forgery are peculiar inks which cannot be imitated nor cleaned off, peculiar paper, presswork executed both on the rolling-press and upon letter-press machines, and singular signatures, numbering and gilding.

The paper used for governments or for great corporations is frequently manufactured for them alone, and contains within it some peculiar fibre or method of making. This is one of the best methods of prevention of forgery, as such paper would not be made for any other than well-known persons, and would be delivered to a good business house for the execution of the printing. The only chance of the forger is to steal some of the paper, and as paper is heavy a great deal cannot be taken at once. Printing with two colors tends to safety, and printing in three or four colors is still more difficult, as the number of printing-offices which can do this work well is small. It may be laid down as a truth that whatever is done by one man habitually can be done by another. And there are no colors known to one ink maker or chemist which cannot be repeated by a second. The method chiefly adopted is to have the design large and of considerable complexity, and then have each part engraved with the utmost care. There are enough persons who are willing to take the risk involved in counterfeiting to imitate the largest and finest productions of the bank-note engraver, but unfortunately for them they cannot come together and work upon a single job. They are in different places and are nearly all under suspicion; if they should unite they would certainly be captured, and consequently they are compelled to work in small squads, two, three or four at the most. Their tools must be simple, as they are frequently obliged to destroy them, and the really artistic work upon a certificate or note is generally executed by one man, as it is impossible safely to invite the co-operation of others. There is, therefore, much unevenness in the execution of a counterfeit note. It may appear as good as the original taken altogether, but certain details will be deficient. Acute eyes soon discover discrepancies, and the security is then no longer negotiable.

One method which seemed likely to overcome these difficulties in the way of imitation was that of photography, but this is not available when two or more colors are used, and it does not take a good reproduction from monochromes. Its value would be in process plates, if those could be used. It is, however, unfortunately the case that a printing-plate made by the action of light upon gelatine or other sensitive material is never as good as copperplate or type work. There is a certain scratchiness and inefficiency about the lines which reveal the method by which the plate has been made. If, on the contrary, the lines are charged with ink the print looks muddy and indistinct. Modern preventives of forgery therefore consist in excellent work everywhere, the officials knowing that, while possible, it is highly improbable that counterfeiters can imitate with exactitude the whole of a bond or bank-note; the use of peculiar paper, usually of a different color from that generally employed; more or less multicolored inks; care in the pressroom, to see that no sheets get lost, mislaid or stolen, and a sufficient number of signatures afterwards so that the genuineness of the security can be easily tested.

The only method not so far mentioned is that which cannot be imitated by the hand of man, although photography will give a reproduction. It is nature printing. It has been observed that in a kaleidoscope, no matter how many may be the changes, the same design never recurs. The veining of one leaf differs from that of another, and however closely two objects of one kind in nature resemble each other, there is always to be found some variation, generally great. Advantage has been taken of this to take molds in wax or plaster, from which stereotype plates can be made. It will be impossible to repeat the design if the plate is destroyed. Another might be made somewhat like it, but not identical. Upon this subject Alfred E. Parks a few years ago read a paper before the New York Typographical Society which gave a very clear explanation of what could be done.

He remarked that nature furnishes an infinite variety of products and processes from and by which printing-surfaces may be obtained, each kind repeating itself somewhat in general appearance, but never in detail, each being beyond the power of man to imitate, and most of them exceedingly beautiful, so as to admit of being used in ordinary ornamental work. Take, for instance, a little sulphate of magnesia, commonly called Epsom salts; make a strong solution, cover the face of a piece of plate-glass and let it evaporate very slowly. The glass will be covered with a foliated network of crystals, somewhat like window-glass on a frosty day, except that, properly done, the crystals will be separate and not connected at the edges. A mold may be taken by pressure in wax, from which the salts can be washed out by water; then take an electrotype from this, which in turn is to be used as the mold from which to obtain the plate to be printed from, and you have a beautiful picture of crystallization which cannot be reproduced by the same process, for the crystals will not dispose themselves twice alike any more than the glasses in a kaleidoscope; nor by hand, for it is too complicated to draw; nor by transferring or lettering, for it has been partly printed over with black lettering. Oxalic acid similarly treated gives a much finer crystal, and a plate which must be worked with the best black ink. Coarser but still exquisite crystals may be obtained by soaking a slab of marble in water all night and in the morning wiping the top dry and packing it in a freezing mixture. The water, forced to the top, will freeze in beautiful foliated shapes. The mold from this might, perhaps, be taken in plaster; but if wax is used it must be quite cold. Again, a solution of gum tragacanth is made, as in the marbling of paper. Have one oily solution and one solution of ox-gall, which sprinkle precisely as for paper; if preferred add a few iron filings to one or both solutions. These solutions will spread exactly as colors diffuse themselves. Having obtained a satisfactory surface, take it up on a piece of zinc instead of paper; expose the zinc to acid, as in the anastatic process, and the oil-covered parts will not be affected. This will produce a beautiful marbled ground which, if well done, it will be next to impossible to copy. Take a sheet of gutta-percha; warm it; sprinkle iron filings upon it and fold it over two or three times, kneading it slightly. Let it get cool and hard; then cut it carefully in two across the folds and there will be a series of irregular layers of filings and gutta-percha, the beauty of which will depend upon the skill exerted in manipulating them. Try again if not pleased at first, and when suited dip the smooth face into nitric acid, which will eat out the iron and leave the gum. Take a plaster mold from this and a stereotype plate. A wax mold cannot be taken, because the wax will stick in the rough places where the filings have been eaten out. Of course, the lines may be waved. Take a block of some knotty, irregularly grained wood and have it planed across in the direction in which the grain is most distorted. Then soak it in sulphuric acid, and the softer parts of the wood will be charred and destroyed faster than the harder spots, so that the grain of the wood will appear in ridges and hollows. This may be duplicated by a plaster cast and stereotype, and, on account of a peculiarity in the grain of most woods, will be absolutely incapable of reproduction, even by the same process and from the same block.

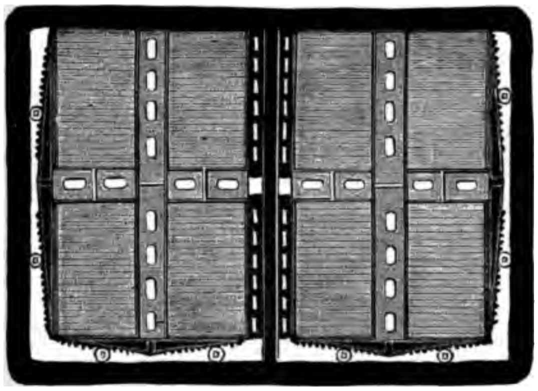
If a pane of glass is firmly held by one point and sprinkled with fine sand or lycopodium seed, and then if a violin bow is drawn across the edge so as to produce a musical note the seed will arrange itself into very curious figures—stars, squares, triangles and so on. These cannot be reproduced exactly by the same process without getting the same pane of glass, or at least one of the same shape, size, thickness and density, holding it at the same point, drawing the bow at the same place and having the same quantity of seed sprinkled in the same manner. The figures, however, may be taken in a wax mold, from which the seed may be eaten out with acid before taking an electrotype plate.

But the most valuable method of producing impressions of natural objects which cannot be imitated is that which is conducted as follows. If a soft object is pressed powerfully between two plates of metal even tolerably hard it will nevertheless leave a full impression on them, which can be used for printing. Thus, if the leaf of a tree is placed between two plates of lead or copper and passed through a rolling-mill each plate will receive a perfect impression of the leaf, which may be used as an engraved block, printing the leaf in white on a colored ground. It may, indeed, generally be used after the copperplate fashion. Numbers of natural objects which never exactly duplicate themselves may be used in this manner to obtain tint grounds of great beauty, such as feathers, the inner bark of trees, skeletons of leaves, leaves of the arbor vitæ, and so on, very few of which could be imitated and all of which would be of value. A large feather, with every alternate vane cut out carefully and removed by combing, would form a splendid ground, for the barbs and hooks on the remaining vanes would appear finer than the finest engraving.

Forks.—Receptacles which hold the spindles of machine rollers.

Form.—A page or pages of type in regular order and ready for printing. It consists of the type, the footstick, the sidestick, the quoins and the chase. In book forms there are also additional pieces of furniture between the pages. It is essential in a well made-up form that every page shall be of exactly the same length, no one being a lead shorter or longer than another. This is accomplished by making up each page to a gauge, the foot-line being added on ordinary pages, blank pages and short pages having quadrat lines, slugs and pieces of furniture added until they are also of the length of the full pages.

Making-up in a book form begins at the lower page, nearest the left hand, at one corner of the form. The pages having been laid down, and compared after being laid down to see that none are transposed, the furniture which goes between them is added, the chase is put over, the side and foot sticks are laid in their positions, the cords are taken off, the inner first, and the other pages are pushed up against the furniture which surrounds them. Quoins are then put in and tightened with the finger; the form is again looked over to see if any page is short or long, and the locking-up begins. Before the pages are really tight they are planed down, an operation which is generally repeated when the locking-up is complete. The solidity of a form entirely depends upon the squareness with which the type stands on its feet, the trueness of the furniture, the absence of binding, and the evenness and thoroughness of the pressure upon the type from all sides. Metal furniture should always be used when possible, and iron sidesticks and footsticks are better than those made of wood. Opinions are divided in respect to the value of wooden and mechanical quoins. Pressure should first be applied to the bottom of pages rather than to the side. If the form is large, crossbars are advisable, those welded in being preferable to the shifting bars. The chase should be as thick as is practicable. If one of a pair it is necessarily thin where they join. All chases bulge somewhat when locked up, the thinner more than the others. This cannot be entirely remedied, but when it exists the quoins at the ends of the sidestick and footstick should be tighter than those in the middle. Electrotype forms must be locked up very tightly. The cut shown is a French one. It is not considered good workmanship in this country to have the sidesticks and footsticks incline towards the centre of the form, for the force used in locking up one tends to make the other weak. The thick end of each beveled piece should rest against the chase.



FORM.

Newspaper forms are so arranged that they can be made up with expedition, and consequently it is the habit on daily papers to handle each page separately. This enables a great number of make-ups to work at once. Each page in country papers is frequently on a small stone by itself, but more generally on a stone which holds two pages. In the latter case three men can work at once on a given page, one at the top, one at the bottom and one at the side, but in the former four men can be employed. The beginning of each page is at the left hand, nearest to the make-up. No furniture of wood is used, all sidesticks and footsticks being of iron. The ordinary six and seven column pages can be lifted from the stone by one man and taken to the elevator for the pressroom by him, but larger forms are carried by two men. They lift the form from the stone just as if it were a board, and do not tilt it on its edge, and it is placed on the stone in the same way. Very heavy forms, or those weighing beyond four hundred pounds, are best taken off and on by a miniature derrick.

If the form is intended to be worked on a type-revolving press, now almost out of use, it is made up on a bed known as a turtle, a page at a time. The page forms a segment of a circle, the curve being very gentle. The head-lines and the heading of the page follow this curve. The columns are made up on the top of the turtle, the rules used at the end of articles and the advertisement rules being hollowed at the centre of the bottom and convex at the top. Each column is secured by a column rule, much thicker at the top than at the bottom, and these column rules are rabbeted into the head-line and the footstick. After the whole page is made up and justified the matter is planed down and then locked up by screws. Each part of the page is held in place by the other parts, a necessity for preventing a loss of the whole or a part by centrifugal action. The whole turtle, meaning the bed and the form upon it, is placed upon the outer circumference of the drum of a very large cylinder, which makes three thousand revolutions an hour. Unless thus securely fastened there is great danger of accident.

Since the general introduction of paper stereotyping the turtle and the press upon which it was printed have been dispensed with, but pages are still made up on trucks with tables, standing about three feet high. This has been so great a convenience that it is likely never to be discarded. The furniture is all metal, the locking-up is accomplished by screws, with or without the wedge system, and the page is slid off from the make-up table to the hot table of the stereotyper. It is doubtless the case, as alleged, that justification on daily papers is far worse than it used to be when type itself was used upon the press.

In job offices many forms are made up in chases of just about the size of the paper used. Some of these are very long in proportion to their width. A useful innovation in England is to have pieces of steel or iron furniture cross the page, acting as reglets, so far as the appearance of the printed matter is concerned, but fitting into notches in the chase and sidestick, thus preventing any sagging. Such an expedient as this is well worth considering, as poster forms are frequently the very largest which a press can take on. All assemblages of plates for a press designed to go on at one time constitute a form. They may be for several sheets of a given work, or for sheets of different works imposed or put on the press together.

When forms have been worked off they are deposited in some secure place, except they are to be immediately distributed. Unless they have wood-cuts in them they are usually wet at this time, lye being used to clean off the ink. It is common in most small and in many large offices for the forms to be set up, in a somewhat inclined position, against any convenient wall or frame, sometimes being kept there for a long time. Another plan is to insert them in a rack partitioned off, each wall having an incline. This is much preferable to the other way, as accidents can happen very easily to such exposed forms. But still another plan is to put the forms into a rack made of two cleats, one upright and against the wall, the other horizontal on the floor. The latter prevents them from slipping sidewise, and the one fastened against the wall keeps them upright. It is far cheaper than the other, and the forms can be looked at much more easily. In a large office tags should be tied to each form so that it can be quickly identified. All the standing forms should be frequently examined, the furniture looked at and the quoins tightened. If the whole looks very shaky draw out the form, place a letter-board to the back, lay it upon a stone and lock it up again. If any pages are loose add a lead or two. Standing forms should not be picked. Many forms are laid upon letter-boards and there preserved between one working and another. This is sometimes necessary where there are many wood-cuts or wood-mounted electrotypes.

Form Dances.—When the lines have not been well justified, or if anything at the ends prevents them from being tight when locked up, so that when the compositor tries if the form will lift, and finds that quadrats, letters and spaces or any of them drop down and will not rise, it is said that the form dances.—*Moxon.*

The term is more properly applied to a form when, in being lifted from the stone, letters, spaces or quadrats will drop lower down than their proper situation without entirely disengaging themselves from the form. This frequently happens.—*Savage.*

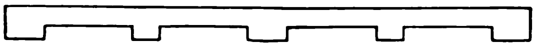
Form Rises.—This is said of a form which has been properly made up and properly locked up, and consequently lifts without sagging or leaving letters behind.

Form Springs.—A form springs when, owing to unequal or imperfect locking up or to having too great a quantity of wood in it, it bows upward, like an arch. The remedy is to loosen it slightly, plane it down, and then lock it up again, when it arises from simple causes. In other cases it is well to examine the form carefully to see what occasions this defect.

Form-Board.—The same as LETTER-BOARD, which see.

Form-Carriage.—A small truck on two wheels for moving forms about. The tires should be covered with india-rubber.

Form-Gauge.—Gauge used for measuring margins of forms.



FORM-GAUGE.

Form-Hook.—A hook used for fishing small forms out of the lye trough.—*Jacobi.* This practice is unknown in America.

Form-Lift.—A lift or elevator to carry forms from floor to floor.

Form-Racks.—Racks made for holding forms in a perpendicular or slanting position.

Forma (Ital.).—A sheet upon which both the first form and its backing are printed. In Spanish this indicates a form of type. Forma or tamaño, the size or shape given to the pages of a book so that they will correspond to a given form, as octavo, duodecimo, &c.

Format (Fr. and Ger.).—The book, when considered according to the size and form of page; also the form, considered on the stone.

Formatbildner (Ger.).—A maker-up.

Formatbildung (Ger.).—Imposing a form.

Formato (Ital.).—The size and shape of a book.

Forme (Fr.).—A form. This is also another spelling of form, common in England, but which does not seem to rest on good authority. The question was raised some years ago by William Spurrell, a leading typographical authority in England, whether the superfluous e was correct. The editor of the Printers' Register wrote to William Blades, who replied that in his opinion form was the preferable spelling. The word was used in that way by Moxon, Smith, Luckombe, Stower, Savage, Timperley and all Americans; forme was used by only five persons, Johnson, Hansard, Southward, Gould and Wilson.

Fornituras (Sp.).—Sorts (to make up a shortage in a new font of type).

Fort (Fr.).—Thick, strong; papier fort, thick paper; un fort volume, a thick volume.

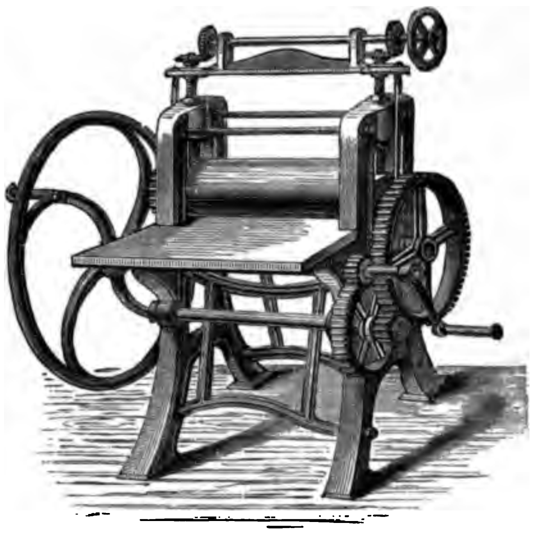
Forties.—Sheets of paper folded into forty leaves or eighty pages. It is really a thirty-two with an inset of an eight.

Forty-Eight or **48mo.**—A sheet of paper folded into forty-eight leaves or ninety-six pages. It is a thirty-two with an inset of a sixteen.

Forwarder.—One who works at forwarding.

Forwarding.—The processes in binding a book, exclusive of the merely ornamental details at the last. The term begins with folding, as used by some binders, but with some others only when the sewing is completed. The sheets arrive from the printer's in a perfectly dry state, with the ink set, and having passed through the standing press, where the indentations have been taken out. They are folded in the bindery, with one fold for four pages, two for eight pages, three for sixteen and four for thirty-two. Further than this folding very rarely goes, as the thickness at the fold makes the sheet unequal. Great care must be exercised in this operation. When there are many folds or the paper is very stiff it is advisable to cut the head of the sheets, doing this just beyond the back or middle fold. This prevents the sheet from running into a side crease. The sheets upon which sixty-four, seventy-two, ninety-six or one hundred and twenty-eight pages are found are only thus imposed and printed for the convenience of presswork. They should generally be cut apart, so that two, three or four sections can be made from them, each of these sections then folding without regard to the others. A section differs from a sheet in being the number of leaves which are sewed together at once. Much folding is done by machinery. See under FOLDING, FOLDING-MACHINE and SECTION.

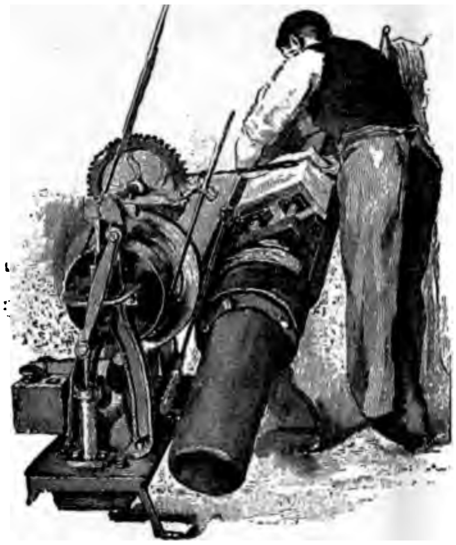
After all of the sheets of a book are folded they must be brought together, so as to make from the whole as many books as there are sheets in any part. A certain book may have eight hundred pages, with sixteen pages in each sheet. The edition is two thousand. There are consequently fifty piles, each of them having two thousand sheets. If the book has been a long time in going through the press nearly all of the sheets may have been folded and put away before the time comes for binding any of them. They are then brought out, or enough of them for present uses, and when sufficient has been taken the remainder is again put away. On a long table or on several tables these fifty piles are arranged in regular order, each according to its signature or the mark at the bottom of the first page intended for a direction to the binder. The girl who gathers begins at the last sheet, laying it on her left arm, and then the next to the last, and so on until all are gathered, the sheet last gathered, or the title-page, having no signature. She lays down this gathering or collection of sheets, which will make one perfect book, and then begins another. Several girls are usually thus employed at once, and when



ROLLING-MACHINE.

the book is in a hurry many of them. They thus get into each other's way. A more convenient method of gathering is to have a revolving platform, upon which the sheets are placed in regular order. The girls sit around this table, and as the piles pass by them take one sheet off of each. Thus great speed is attained. See GATHERING.

Collating is examining the sheets brought together thus in books, to see that none are omitted, doubled or misplaced. It is done very rapidly. When forms are imposed as fours, eights, sixteens or thirty-twos little difficulty can arise. Signature C follows signature B, and so on throughout the alphabet, omitting in some places the J and in some others V or W, and signature 11 follows signature 10, if figures are employed. But in twelves, eighteens, twenty-fours and other forms which are the multiples of three, part of the sheet is generally cut off and folded in as an inset. These are denoted by secondary signatures, usually a star added to the first or regular signature. Much care must be taken that these are right. So, also, pains are necessary with detached maps or plates. Formerly a table giving directions to the binder where these should go was printed with the book; but this custom has died out. The binder must now obtain verbal or written directions from the publisher or person who desires to have the book bound. Mention has been made of the mark on the back of magazines, which is continuous if the collation is correct, broken if any pages are omitted, and lengthened if any are doubled. This is, however, impracticable on work generally. In collating the book is held in the right hand at the right top corner; then, with a turn of the wrist, the back is brought to the front; the sections are fanned out, and with the left hand the sheets are brought back to an angle, which causes them when released to spring forward, so that the letter on the right bottom corner of each sheet is seen in turn. The book should always be beaten or rolled before putting in the plates, especially colored ones.



SIGNATURE PRESS.

The next process is beating or rolling. Much of the neat appearance of the work depends upon the solidity which the sheets acquire. This was formerly given by a hammer with a broad, flat face, which was struck against the sheets until they became more compact. The sheets were laid upon a solid piece of iron or stone and protected by sheets of waste paper above and below them to prevent glazing. The thickness of sheets beaten at
once was about half an inch. If the book wa
after beating each part separately they were the
together. The position of the paper was con
changed. In rolling fewer sheets are taken. T
passed through between sheets of tin, the machi
ing a close analogy in its operation to a clothes-w
Care is taken not to put in too many sheets at on
have too great a pressure, as the paper becomes
There is danger also of set-off, particularly in i
made to dry rapidly.

In America, where cloth is the rule, the solidit
book is chiefly attained by hydraulic or other p
without the rolling-machine or without beating.
of these operations are comparatively slow.
draulic press gives a great pressure. Sheets
down as tightly as it can be done in an ordinar
ing press are sometimes reduced to one-half the
the hydraulic press. Another method employed
the signature press. In this the folded sheets ar
in a trough with two sides at right angles to eac
and pressure is then applied at the two ends b
hydraulic, ratchet or screw power. Used imm
after the sheets are folded, it insures great eco
time and space.

When the book is taken out from the press it
made ready for sewing. If for flexible binding t
is not to be sawn in, but marked; if otherwise, gro
made with the saw. In the former the cord lie
outside; in the latter it is embedded in the back
cut or groove. The back of a fair-sized book is
into six equal portions, with the exception of th
most, which is a little larger. This is on accou
optical illusion. If they were exactly alike the
would seem to be smaller than the others. Blac
are now made with a lead-pencil in each place,
the head and tail, as near to the end as possible,
are sawed to receive the kettle or securing stitch.
marks and grooves must be made with great ac
When the book is to be sawn in it is marked as
but the back is sawed both for the bands and the kettle-stitch. The depth of the cut is determined by the thickness of the cord, and that by the size of the book. If too large the cords move in the groove and the book opens badly. Two thin cords are better than one thick one, as they lie flat on the back better than a thick cord. This sawing is now chiefly done by a machine. SEWING and the other forms of fastening the sheets together are treated of under that head. They follow next after the process described.

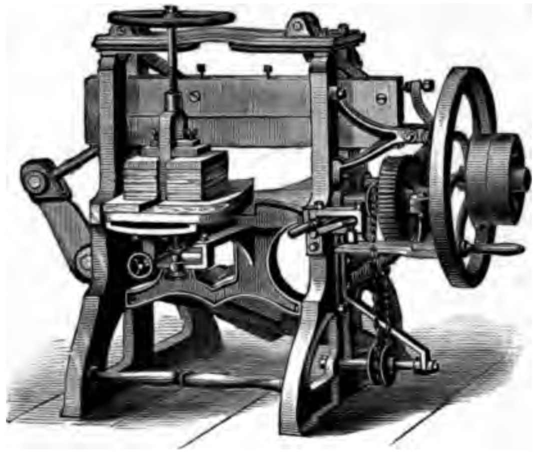
The book is next trimmed, the end papers having been put on. Trimming is simply to cut off the irregularities and to make the edges true, the book being left as large as possible. This is done in a trimming-machine when quantities are required, but when only a book or two is thus to be handled sometimes with a sharp, broad-bladed knife.

SAW CU
A BO

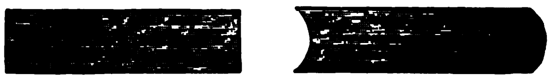
Gluing follows. Glue must be applied to the back to hold the sections together and make the back perfectly true during
the rounding and backing. Put the book betw
pieces of old mill-board, and then again into th
press, leaving the back exposed. Then with gl
too thick, but hot, glue the back, rubbing it in w
brush, and then remove the surplus glue with the
The back must not be allowed to get too dry bef
rounded, or it will have to be dampened with a
to give the glue the elasticity desired, but it sho
be wet. It should be left about an hour, or unt
longer feels sticky to the touch, but still retai
flexibility. A flexible-bound book should be

before being glued. The book is then laid on its side to dry, and if there are several books they should be laid alternately front and back, with the back projecting about half an inch. They must be allowed to dry by themselves, and on no account by the heat of a fire. Zaehnsdorf lays down as a rule that all artificial heat in drying in any process of bookbinding is injurious to the work.

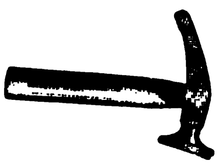
Rounding, which follows, is one of those operations which cannot well be performed by an amateur. It applies to the back of a book, which is made the segment of a circle. The front edge corresponds exactly with it. The book is to be laid on the press before the workman, with the fore-edge towards him. It is then held in the left hand by placing the thumb on the fore-edge and fingers on the top of the book pointing to the back, so that by drawing the fingers towards the thumb or by pressing fingers and thumb together the back is drawn towards the workman at an angle. In this position the back is struck with the face of the hammer, beginning in the centre, still drawing the back over with the left hand. The book is then to be turned over and the other side is treated the same way, the book being continually changed or turned from one side to the other until it has its proper form. When sufficiently rounded it should be examined to see if one side is perfectly level with the other, and leveling is effected by holding the book up and glancing down its back and gently tapping the places where it is uneven until it is perfectly true or uniform. The thicker the book the more difficult it will be to round it, and some papers will be found more obstinate than others, so that great care must be exercised both in rounding and backing, as the fore-edge when cut will have exactly the same form as the back. Some books are not rounded, but are made with a flat back. They have a tendency to sink in. In rounding space is given for the greater thickness required at the cords and for the stiffness at the folds. Backing, the next process, is carefully described under BOOKBINDING.



TRIMMING-MACHINE.



BOOK BEFORE AND AFTER ROUNDING.

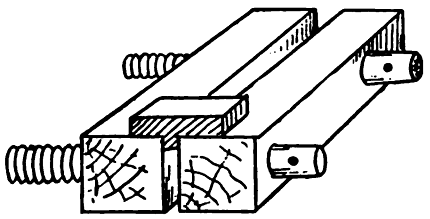


BACKING-HAMMER.

Putting into boards is the next process in leather binding, but the last or next to the last in edition work. In the latter the cover, which is a board enveloped in muslin, is complete when added to the sheets, but in leather or extra work the pasteboards or stiff sides are added while there is still much to be done. The sheets are obtained, cut to the proper size, trimmed and made square. Edition boards are cut by a rotary cutter into a number of strips at a time. For smaller lots table shears are used for cutting. These have one stationary blade, facing upwards, and a movable blade facing downwards. There are also portable shears. When ready the covers are lined on both sides for whole binding, and on one side for half binding. The reason for lining them is to make the boards curve inwards towards the book. The various pastings would cause the board to curve the contrary way if it were not lined; a part of the paper turns over. When pasted it is advisable to press the boards to make more certain of the paper adhering. When the books are very thick two boards must be pasted together, not only for thickness but for strength. They should be put in the standing press over night. The thinner board should always be next to the book. After lining the boards they should be allowed to dry, as when received they generally have considerable moisture When perfectly dry they should be again trimmed and squared. They are then attached to the book by lacing the ends of the cord through holes made in the board. The boards are to be laid on the books with their backs on the groove and level with the head; they must then be marked either with a lead-pencil or the point of a bodkin exactly in line with the slips, about half an inch down the board. The mill-board is placed on a piece of wood and holes are pierced in it by hammering a short bodkin through on the line made at a distance from the edge in accordance with the size of the book. The slips are scraped, pasted slightly, tapered or pointed, and tapped slightly when the board is down to prevent them from slipping and getting loose. When the cords are drawn through, the ends are cut close to the board with a knife and hammered well down on the knocking-down iron to make the board close on the slips and hold them tight. The slips should be well and carefully hammered, as any projection will be seen with great distinctness when the book is covered.

MILL-BOARD SHEARS.

The pile of books is now put into the press, a tin being between each mill-board and the book. This flattens the slips and prevents their adhesion. The books are then pasted and allowed to stand a few minutes to soften the glue. Then with a piece of wood or iron the glue is rubbed off and the backs are well rubbed with a handful of paper shavings and left to dry.

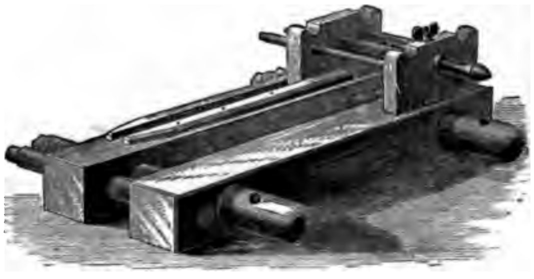


KNOCKING-DOWN IRON SCREWED INTO PRESS.

Cutting is the next process. A press and plow are used for this, or a cutting-machine. The top and bottom are first cut in this order, and then the front edge. In the latter the back is pressed flat, the edge, of course, being exactly the same. When it has been properly done the volume will resume its original rounding. This is known as cutting in boards. Cutting out of boards is a different process. The fore-edge is cut before gluing up, if for casing, taking the size from the case. The back is then glued up, rounded and put into the press for half an hour to set it.

After the back has been rounded and glued it is cut at the edges or plowed. The shaving should be as small as possible, as nothing adds more to the beauty of a book than a wide margin.

Cheap books are generally left with edges in white, just as they come from the sewer, but it is very common to use some ornament. The edges may either be sprinkled, colored, marbled or gilt. A number of volumes are clamped very securely together and their edges are thoroughly scraped with steel scrapers until the surfaces are completely smooth. Sizing is then applied and the gold-leaf laid upon it and left to dry. The gilder then proceeds to use his burnisher. The lower end of this instrument, armed with an agate or porphyry tip, is rested upon the gold, now dull and uneven, and the upper end rests against the burnisher's shoulder, thus enabling him to apply no inconsiderable power to his work. Under this manipulation the book edges soon take on the beautiful and lasting lustre so much admired by connoisseurs.



BINDER'S PRESS AND PLOW.

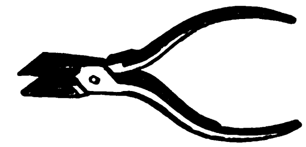
If the edges are simply to be colored the aniline or other dye is applied, mixed with paste and a little oil or glair and oil. Then with a sponge or a brush the whole of the edge is colored. In coloring the fore-edge the book should be drawn back so as to form a slope of the edge, so that when the book is opened a certain amount of color will still be seen. It is often necessary to give the edges two coats of color, but the first must be quite dry before the second is applied. A very good effect may be produced by first coloring the edge yellow and when dry by throwing on rice, seeds, fern leaves, a bit of lace or anything else according to fancy, and then sprinkling with some other dark color. Gilding and Marbling, elsewhere described under these heads, are also used.

SPRINKLING-BRUSH AND SIEVE.

The head-band comes next. This is an ornamental band inside of the cover at the very top and beyond the leaves of the book. A somewhat similar band is in a corresponding position in the bottom of the book. Its original idea was that of a cord, answering the same purpose as that which is now given by the kettle-stitch or securing-stitch, but it has gradually become a piece of pure ornament. On good books it is a twist of different colored cotton or silk around a piece of vellum or catgut fastened to the back every half dozen sections. Stuck-on head-bands are easiest made by using striped calico.

Covering is next prepared for. One or two thicknesses of paper are glued to the back, the second piece being glued to the first. Part of this paper is accurately folded over and back upon itself, and this is covered with glue on the surface. When dry the surplus paper is cut off. The bands are prepared beforehand by sticking with glue two or three pieces of leather together or on a piece of paper, well pressing them, and then allowing them to dry under pressure. They should be glued and dried twice. When wanted the proper thickness is chosen and the leather is cut into strips to correspond with the size of the book. The usual number is five strips. The strips of band are then moistened with a little hot water to cause the glue upon the paper to melt. This will be found to be a better plan than to cut the strips first and then to glue them. By the latter the glue is likely to spread and to stain the leather black. In flexible work the leather is fastened directly upon the book. The head-band is held tight by gluing a piece of fine linen against it.

There are a great variety of coverings for a book, and each and all of these are used at times. They are leather in its various forms; textiles, including silk, cotton, linen and velvet; imitation leathers and hard materials like ivory and silver. In an ordinary morocco binding the problem is how to cover the outside of the two covers, including the back, and turn in the edges in the neatest way. The skin is laid on a flat board and cut according to the size of the book. About three-quarters of an inch should turn in. The edges then are shaved so as to give them a bevel. This is done with a knife. The grain is brought up with the hand or a piece of cork. When ready the morocco is well pasted, each side having its proper projection. The book is laid evenly upon the cover, which must be gently drawn against it. The back is made tight by placing the book on its front edge and bringing the skin down well over it. The sides are next drawn tight, and the bands are pinched well up with a pair of band-nippers. The four corners of the leather are cut off with a sharp knife in a slanting direction, a little paste is put on the cut edge, and the operation of turning in is begun. The leather should be perfectly even in all directions, without wrinkles. Calf should not be touched with iron tools, as they turn it black. Vellum or parchment should be lined with white paper to prevent any darkness of the board from shining through. Vellum must not be stretched much, as when it becomes dry it wrinkles and draws up the boards. Cloth is covered by gluing the cover all over and turning in at once, gluing one cover at a time and finishing the covering of each book before touching the next. Half-bound work is that in which the back, a part of the sides and the corners are covered with leather. This follows, as far as possible, the procedures given above. The last of these operations is pasting down or covering up the inside board by pasting the end papers to the boards. By this any irregularities are hidden, and the whole is given a fresh and clean appearance. When all of this is done the book is complete so far as durability and strength are concerned. It only needs to have the lettering and ornamental designs added. These will be found described under the head of Finishing.



BAND-NIPPERS.

Edition or Cloth Work.—It is proper to apply the term edition work to books bound in leather when done in large quantities and expedited, but it is now rarely used for any other than cloth work. The distinguishing feature of the latter is that the cover is prepared separately from the remainder of the book and is then affixed to it by glue. In this work pressing, and to some extent folding and sewing, is done by machinery, and advantage is taken of every circumstance which will lessen the cost, while at the same time preserving a presentable appearance. The covers are two pieces of strong pasteboard cut squarely of the exact size which is needed, and beveled when required. They are covered with muslin, the cloth extending beyond the boards, so as to allow room for turning in, and between the boards so as to form the back and hinges. The muslin is glued over its whole surface and then turned down neatly on the inside, the part between the two covers being lined for greater strength and stiffness. A slight indentation is made at the edge of the back to form the groove or joint upon which the sides must play. The cover is then ready for ornament or finishing.

For books which are to have only a small edition, where expense is an object, it is not necessary to have a fresh design for the back. Stock ornaments, lettering and lines are put together and used; but where a number of books at all ornamental are to be made a brass design for the cover is advisable. This is in one piece, and there is no danger of a part slipping by, and it also can be heated, which cannot be done so well with type or an electrotype, which is the nearest substitute. If not to be heated a pen-and-ink drawing, turned into type metal by photographic reproduction and then electrotyped, is excellent. The lines must be heavier, the shading less and the spaces between the lines more than for printing on paper. When finished the hollows should be very thoroughly routed and chiseled out. The cover of an edition book as made separately is called a case. After covering the inside with paper to hide the ragged edges, and allowing the cover to dry, it is stamped or embossed in the embossing-press. If the ornaments are blind no heat is required, and pressure alone is needed; but the lettering is generally gilt. Glair having been put on and gold-leaf laid over it, the die also being hot, the pressure makes the requisite indentation, and the gold adheres where the plate was heated. The surplus gold is afterwards wiped off. Since the introduction of job-presses or small platen-presses it has been found that they are available for this work, giving sufficient indentation and printing the required parts with printing-ink. Such work is both cheap and ornamental, and can be used with good taste. Stronger presses are required than for circulars or cards, the half-medium doing very well for octavo covers. Blind work can also be executed on these presses. When ink is used the quantity should be large, giving a full color. Overlaying is hardly practicable, the covers differing so much in thickness. Dusting, bronzing or frosting can also be done upon books treated in this way, size being used instead of ink. When the gilding or embossing is completed the muslin cover can be attached to the book by pasting the fly-leaves, and generally one of those in toned, colored or ornamented paper, down upon the inside of the cover. Muslin can be used to strengthen this connection, if desired. Half-bound work and even good full-bound work is frequently treated in much the same manner. The covers are entirely prepared in advance, and are then fastened to the book by the fly-leaves or by paste directly on the back.

MACHINE FOR BEVELING BINDERS' BOARDS.

Forza di Corpo (Ital.).—The size of the body of a letter.

Foster, John, the first printer in Boston, was born at Dorchester, Mass., and graduated at Harvard College in 1667. He began printing in Boston in 1674 or 1675, hiring workmen, as he is not known to have learned the trade himself. He died at Dorchester on September 9, 1681.

Foster Press.—A perfecting-machine, used in England, made upon the ordinary stop-cylinder principle. It has only one printing-cylinder, with no tapes around it.

FOSTER PRESS.

Foster Typesetting-Machine.—An apparatus for setting type, invented by Fenton G. Foster, of Wakefield, N. C., who had been a colonel in the Confederate army. His machine was very ingenious, capable of being made at a low price; but it never advanced beyond the experimental stage. It was first shown in 1874. Its action consisted in dropping the letters from a series of receptacles through grooves to a central place, whence they were urged forward in a long line. There was no justifying or distributing attachment.

Foul Case.—A case so badly distributed that the letters are not in their proper boxes, with the spaces not properly separated, and with bad letters, wrong letters and spaces to be found in the quadrat box.

Foul Proof.—A proof with many errors marked in it.

Foul Stone.—An imposing-stone covered with letter, quoins, furniture and other things which should have been cleared away. Stower gives a regulation by which every compositor who should leave a foul stone, either of letter or furniture, was fined a penny.

Foulis.—The name of a family of printers in Scotland in the last century whose work was extremely handsome as well as accurate. Robert Foulis was in the beginning a barber, but began work as a printer in 1740. Three years later he was appointed printer to Glasgow University, and in 1744 he brought out a famous edition of Horace. Shortly after this his brother Andrew, who had been a teacher of French at the university, joined him, and their union of taste and exactness enabled them to print with credit a great number of the classics, as well as many fine works in English. At one time they hung up sheets of proofs in the university, with the offer of a guinea reward to any person who should find an error. Their edition of Homer is regarded as very splendid. Andrew Foulis died in 1775, and Robert Foulis died in the year succeeding.

Founder.—A short term for a letter-founder or type-founder.

Foundry Chases.—Small chases used for stereotyping or electrotyping.

Foundry Clumps.—Pieces of metal, type high, to protect the plate. This term is not used in America.

Foundry Proof.—The final proof before stereotyping or electrotyping.

Fount.—Another spelling of the word FONT, which see.

Fountain.—A reservoir of ink, with holes or interstices for the ink to pass through in small quantities to a roller or rollers below. The quantity passed out is regulated by a gauge, similar to the method by which the waste-gate of a dam is raised to allow a portion of the water to flow away. The higher the gate is raised the more fluid runs out. Ink of the higher qualities is very viscid, and it cannot be determined beforehand with a new quality how rapidly it will flow through a given aperture. The discharge is also determined by the temperature, warm ink being more fluid than cold.

Four-Em Dash.—A metal dash, four ems long, still cast in England, but very rarely here.

Fourdrinier Machine.—This machine, which does for paper-making what the power-press does for printing, was invented in France in the year 1799. One of the workmen employed in the mill at Essonne, in that country, Louis Robert by name, conceived the idea that if the paper pulp could be delivered on an apron in a regular current and was evenly distributed the water could be pressed out of it and the wet sheet dried before leaving the machine. He took out a patent for this, and the French government gave him the sum of 8,000 francs as a reward. Leger Didot, the director of the works, bought Robert's machine and his rights for 25,000 francs, to be paid by installments. He then went to England to sell the English patent. In this he was successful, but his French patent lapsed. Henry and Sealy Fourdrinier were the purchasers in 1804, the first patent having been granted in 1801 and the second in 1803. The Fourdriniers were at this time the leading stationers and papermakers in Great Britain. Soon after Didot's arrival in England at Dartford, in Kent, he and John Gamble, an Englishman who had come with him from Paris, began to experiment, their working engineer being Bryan Donkin, who was afterwards a well-known machinery manufacturer. The attempt was successful, and in 1803 a machine was in operation which performed the work satisfactorily. Successive improvements were, however, necessary. In 1806 the machine with nine hands did the work of seven vats with forty-one hands, the one costing £734 and the other £2,604. To make paper by hand was then worth sixteen shillings a hundredweight, but by the machine it was only three shillings and nine pence. In 1813 the capacity of the machine was increased to double the quantity of what it was able to turn off in 1806 and at one-fourth of the expense. The Fourdriniers, it is said, spent £60,000 upon the improvement of the invention, but reaped nothing from it, as their patents did not last long enough to return them the money which they had paid out. They failed, in consequence, some little time before their patents expired, those who owed them for royalties not being willing to pay when they saw that the end was so soon approaching. See PAPER-MAKING.

Fowler and Henkle Press.—A machine exhibited in 1889 in New York city, but manufactured in Washington. It is a web press, but only takes on very narrow sheets. The revolving bed is in eight sections, turning, somewhat similar to a belt, around two wheels at each end, the length being greater than the height, like a cipher turned on its side, thus: ⬭. The motion is truly cylindrical, except at the centre for a space equal to one of these sections, and consequently when that is passing under the impression cylinder it is perfectly flat, thus allowing fancy types, tables and cuts to be printed. The moment that the impression is completed the cylindrical motion begins again for that section of a form, and continues until it is in the centre of the orbit beneath, when it again runs flat for its own length. Half of the time the type is reversed, and in this position it is inked. There is also a job press of the same name with a four-sided type-bed and an impression cylinder which sinks or rises as the revolution moves out of a true circle. This is also fed by a web.

Foxed.—Paper stained or yellowed so that it appears of a hue like that of a fox's skin.

Fractions.—These are cast on all sizes from English to agate, and occasionally even smaller. The smaller generally have an oblique form for the dividing stroke, and on em bodies, as this gives a much clearer appearance, thus: ¾; but the more common form is to have the numerator directly above the denominator, as in $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{8}$. Usually speaking only the following are made: ⅛, ⅜, ⅝, ⅞, ¼, ½, ¾, ⅓, ⅔, but occasionally two-fifths, three-fifths and four-fifths are found, while in the Cotton Exchange quotations are made by sixteenths, as: $9^{5}{}_{16}$. Here no attempt is made to introduce a crossbar. In sizes above pica, where no fraction has been made, substitutes are manufactured by putting a thin rule between two figures, one of which is directly over the other. Thus, for English fractions two nonpareil figures can be taken and the rule put between. A Clarendon face would probably look the best. Figures are made by every type-founder for fractions otherwise not to be expressed. In this case the centre bar should be exactly of the length of the longest figures, but as the type-founders do not generally make them with much regard to beauty this rule cannot sometimes be followed. The rule is generally at the top of each character, as: $\overline{2}\ \overline{4}\ \overline{8}$, but sometimes it is at the bottom, as: $\underline{1}\ \underline{3}\ \underline{5}$. These are on half body, and in combination form fractions, as: $\frac{37}{42}$, $\frac{333}{860}$. Frequently in mathematical problems fractions which are in reality whole numbers divided by something are represented as a quantity, in this crude shape, as: $\frac{75\frac{1}{8}}{33} \times \frac{44\frac{33}{16}}{7} = x$. Decimal fractions do not need to be considered, as they are composed as easily as plain matter. Many persons do not appear to quite understand them, however. Seven and three-quarters is represented in common or vulgar fractions by 7¾, and in decimals by 7.75. But the latter could be represented by $7\frac{75}{100}$. It is frequently convenient to treat common fractions in the same way as decimals, by reducing them to a common denominator and then using only the numerators. Thus if it were desired to show the variation between the different spaces, singly and in combination, this could easily be done by employing only the numerators of the fractions which they would make. Sixty is the smallest common denominator, and the spaces therefore are 12, 15, 20 and 30 sixtieths in width. The whole em would be shown by the figure on the left hand of the period, as 1. and the fraction at the right hand. Thus 2.32 would be two ems, a thin space and a thick space; 3.39 would be three ems, two thin spaces and a four-em space. Dollars and cents represent a whole number and a fraction, yet are represented in tables and very frequently in straight setting by no other separation than an en quadrat. A comma in this place is sometimes seen, but is entirely wrong.

Fragezeichen (Ger.).—The interrogation mark.

Fragments.—The odd pages at the beginning and end of a work; also called oddments. These are English expressions.

Fraile (Sp.).—A friar, or that portion of a form which has not received ink, and is consequently printed pale.

Fraktur.—The German expression for their text or black-letter characters or the common body type. Antiqua is the expression for Roman type. The word is occasionally spelled Fractur.

Frame.—The stand or framework upon which cases are placed. See STAND.

Frame Head.—The top of a hand-press was formerly occasionally thus called.

France.—Printing began in France in the year 1469, seven years after the dispersion of the workmen of Fust and Gutenberg. Recent statements, however, have been made that at Avignon the art was practiced at a time considerably before this, and that indeed typography was there discovered. The details for these assertions have not yet been made known fully, and will be given later if available at that time under TYPOGRAPHY. The first printers of Paris were Germans, Ulrich Gering, Michael Friburger and Martin Crantz. They were invited thither by the prior of the Sorbonne, l'Allemande de la Pierre, one of the most learned teachers of his time, and Guillaume Fichet, a doctor of laws. The first book which they printed, setting up their press within the limits of the university itself, was the Letters of Gasparin de Bergamos. It is without date. Sallust soon followed. The form of characters employed by Gering and his associates resembled those used on Roman inscriptions at the time of Augustus. The abbreviations were numerous. Capitals were not used, spaces being left so that they could be painted in by the rubricator. The paper, without being very white, was strong and well sized. In several of these works, particularly in a Psalter and a Missal, red and black inks were employed to distinguish the responses. Both of these books are handsome. Sometimes the book began at the verso or back of the leaf. There were no titles, no numbers, no pagination and no signatures. The first books were in a Roman character, but later for a number of years they were executed in black-letter.

Michael Friburger and Martin Crantz most probably returned to Germany in the year 1478, as the name of Gering alone appears in the publications made subsequent to the month of October. In 1494 he associated with himself Bertrand de Rembolt, who was originally from Strasbourg. Gering died on August 23, 1510, leaving a considerable legacy to the College of Montagu, and other moneys to support two doctors, one of whom was charged to read the Old Testament in the morning and the other the New Testament in the evening. The second printing-office in Paris, which had for a sign the Swan and the Soldier, was begun in 1473 by Pierre Kaiser and Jean Stoll, both Germans apparently, from their names. The number of printers increased rapidly. One of the leaders was Antoine Vérard, who began in 1480 to publish works, the greater part in French, with beautiful Gothic characters. These publications are numerous, and are to a great extent upon chivalry. The books of hours got out by these printers were very beautiful. Jodocus Badius Ascensius, a learned printer, who had been a professor of belles-lettres in the University of Paris, and had been a corrector of proofs to his father-in-law, Jean Trechsel, began printing in 1495. Thielmann Kerver and Philip Pigouchet became noted as printers of ornamental books; but the most famous of the early French printers was Henry Stephens, to be succeeded by his more famous son, Robert. Simon Vostre did some good work towards the close of the fifteenth century. Sixty-nine master printers had been in business in Paris before the close of the year 1500, and there were forty in Lyons. The work in the latter city was cheap and in showy bindings. In the language of the modern book trade most of the publishers or printers were "pirates." They copied every good book issued elsewhere. Their first printers were Boyer and Le Roy, in 1476. Angers opened an office in 1477, Chablis in the next year, Poitiers and Toulouse in 1479, and Caen in 1480. Twenty-four other places are known to have set up a press by the year 1500.

Among those who in the next century adorned the art or were notable because of some circumstances in their history were Simon de Colines, Conrad Neobar, royal printer for Greek; Denis Janot, Étienne Dolet, Charles Stephens, Frédéric Morel and Sébastien Cramoisy. In the seventeenth century Jean Camusat, Antoine Vitré, François Langlois, Louis Bilaine, Claude Louis Thiboust and Pierre le Petit. The latter published the first edition of the Dictionnaire de l'Académie Française in 1694. Seven editions of that dictionary in all have appeared up to the present time, and the eighth is now in preparation by the Académie. In 1698 and 1713 the name of Didot first appears. In the former year Marie Anne Didot, daughter of Denys Didot, was admitted as a bookseller, and in the latter year François Didot, son of Denys, was also admitted. This family, which sheds lustre upon typography in France, thus began by selling the books of others. The celebrated name of Barbou appears shortly after. Other names are those of Anisson, Beaumarchais, Panckoucke, Debure and Simon. Franklin had a private printing-office at Passy while he was minister to France from this country. In the early part of the present century the Crapelets were very distinguished.

In other cities of France there have been many famous printers. Trechsel was in Lyons in 1487. Pierre Maréchal was the first printer for Rabelais; Gryphius and Frellon were also of Lyons; Lallemant was at Tours, Mame at Lyons, Pinard at Bordeaux and Desrosiers at Moulins. Each did much good work.

The earliest printer in Paris, Ulrich Gering, was, like all others of that day, compelled to make his own types. One face was a Roman and the other a round Gothic. The latter for a long time was the most popular. After a few years Geofroy Tory, an accomplished man, undertook type-founding, and in 1526 published a book entitled Champ Fleuri, in which he laid down rules for the formation of typographic characters. A certain space was to be divided into square compartments by lines, and each of the strokes of the characters must conform in some respects to the marks upon the diagram. Largely through the agency of Tory black-letter was discarded. Among the punch-cutters and type-founders who succeeded him were Claude Garamond, Guillaume le Bé, Jacques de Sanlecque and Pierre Moreau. Besides the French characters many were cut for other tongues. The King's Printing-Office, continued under another name, proved a school of instruction for letter designers. In 1693 Louis XIV. desired to have letters cut of faultless form, and Jaugeon, a member of the Academy of Sciences, was delegated by it to make the designs. He adopted the same plan as Tory, of dividing the face of a letter into a multitude of squares, but went far beyond him. A wide capital needed, on the system he devised, 2,304 squares to show his plan thoroughly. Pierre Simon Fournier, who lived early in the last century, made excellent types, and also invented the system of points now used in Germany, France and America—in this country of the size he designed, but in France of greater magnitude, following the ideas of Didot. The latter family has had some illustrious type-founders, including Henri Didot, who made punches for type which were no more than twenty-five lines to the inch. Before him there had been several founders of microscopic characters, including Luce. Recent French founders have done much in the way of new faces. Many of these are presented in the Album of Charles Derriey, and many are to be found in the specimen-book of the royal printing-office, issued in 1845. Old faces have been revived and new ones have varied since. A pleasing style is that brought out by Claude Motteroz, the letters in which are rounder and fuller than in other French types.

Job-work forms a very small proportion of the work of a French printer. The preparation of books and pamphlets constitutes the bulk of his labors. Jobs are known as travaux de ville, or city work. In some departments they are excellent, among which may be mentioned rule work. Pictures of scenes in the Alps, portraits, maps and other designs of this kind have been thus executed in a style unequaled elsewhere. The display of posters is regulated by law, and in many other respects printing is surrounded by strict regulations.

A great variety of presses are manufactured in France, Marinoni and Alauzet being the most celebrated makers.

Hand-presses, chiefly of the Stanhope pattern, modified, and of the Columbian form, are much used. The variety of machines is large, ranging from pony cylinders up to the largest web presses. Many are exported to foreign countries. Less metal is used in them than is the custom here, and the presses are run at a lower rate of speed. As distinguished from American productions, the work done in France employs lithography much more, and that part is of a higher quality in small and inexpensive work. Etching is much in demand, and is excellently done. On small editions of good work, where the nature of the printing will admit, head-pieces are etched, while the letter-press is from type. Wood-engraving is well executed and process engraving is excellently done. In the use of colors the French are admirable. In bookbinding their work forms a model for binders in other countries.

France is a land of newspapers. One of the dailies, the Petit Journal, has probably the largest circulation of any daily in existence. It is small in size, and several copies are printed at once upon the press. Much competition exists among newspapers to obtain the pens of popular writers, but little competition is found in news. In the American sense French journals have no news. A considerable fire or a serious accident may happen in one corner of Paris at six in the evening, but will be unmentioned by any newspaper of the next morning, and the whole amount of news gathered in Paris does not exceed that which will be given here by a city of twenty or twenty-five thousand population. The editor aims first to have a readable and sensational novel, then good discussions of theatrical and society matters, then agreeable miscellany, and last news. No Parisian journalist cares anything about a "beat" or a "scoop" on ordinary affairs, but he would consider it a disgrace if his journal did not have an able criticism of the last new part of Sarah Bernhardt. The cost of production of newspapers is very small. Paper is as cheap there as elsewhere, but few journals are larger than double medium. Compositors receive less than half of New York wages, and clerks and reporters are paid very little. A New York daily paper of the first class costs at least fifteen hundred dollars a day to get it ready for press; few Parisian dailies cost five hundred dollars. Extraordinary prizes and gifts to subscribers are given, and a large portion of the income of the journal must be disposed of in this manner. The advertisement columns are sold to contractors, who have the exclusive privilege of filling them. A French newspaper has no advertising solicitors, nor does it take in advertisements over the counters, except as a favor to the contractors.

Paris is alone in the first rank among French cities in regard to printing; most of the type-foundries and press-builders are located there, and it almost monopolizes the literary talent of the country. Lyons is the other city of importance in regard to bookmaking.

Frankfort-on-the-Main, a German city, has for many years been an important centre in type-founding and in the printer's supply trade. It has likewise much increased in importance as a printing centre. It employs about one thousand hands, five hundred being compositors and two hundred pressmen and feeders, the rest being engaged in binderies and miscellaneous work. There are eighty offices.

Franklin, Benjamin, the chief figure in America before the Revolution, one of the leading characters during it and directly afterwards, and a printer of Philadelphia, was born at Boston, Mass., on January 17, 1706, N. S. His father was an Englishman who emigrated to America about 1682 and followed the trade of a tallow-chandler. Franklin was the youngest son by a second marriage, his father having seventeen children in all. After a brief experience in his father's occupation he was apprenticed to his brother James, who had recently come from England with a printing-office. He had always had a love for reading, and to some extent this taste was gratified in his new place. Defoe's Essay on Projec
Mather's On Doing Good were among the books
most influenced him. To obtain more money to pu
books he induced his brother to allow him a certai
of money each week upon which he could sustai
self, and out of this, by adopting a vegetarian d
was able to save much. His brother published a
paper in addition to his other printing, and Ben
secretly contributed to it several essays, which wei
received so long as the author was unknown; bu
James Franklin discovered the writer he berated h
his presumption and treated him with great hars
The journal spoke more freely on public affairs th
General Court deemed proper, and for one of its offenses the editor was imprisoned and ordered not to continue the publication. To evade this prohibition the indentures of the apprentice were given back to him and his name afterwards appeared as that of the publisher. His brother took a dislike to him, showing it by his conduct, and Franklin determined to run away. He therefore in October, 1723, secretly embarked on board a vessel bound to New
York, and after landing there and failing to find
he trudged on to Philadelphia. Andrew Bradfo
Philadelphia printer, had nothing for him to do,
kindly offered to entertain him until something
offer. He found employment soon after with S
Keimer, an enthusiast with little knowledge of bu
or of printing. Franklin soon came to be recogni
the master spirit of Keimer's shop, and, induced
fair words of Sir William Keith, the governor
province, went to London to buy the materials for
office. Keith had no money and no influence, and
Franklin reached London he found that he had
grossly deceived. He sought and found employm
a printing-office there, and during his leisure hou
played his skill in swimming, in which he was an e
He also made the acquaintance of several person
afterwards became distinguished, and wrote a smal
phlet on Liberty and Necessity, a refutation of a w
which he had been engaged as a printer. He ret
to Philadelphia when just twenty-one, intending
gin a mercantile career, but the friend who had en
him as an assistant soon after died, and he was
to return to the printer's trade. In conjunction
young man of the name of Meredith he started a
two afterwards a printing-office of his own, whic
soon very successful. They also published a news
Although Franklin had been guilty of some escap
London, his conduct was correctness itself in Ph
phia. He rose before daybreak, shunned no labor,
until late in the night, lived frugally and took par
of the public business of the town and province
was a good workman, and the productions of his
looked well. His counsel was much sought by all
able citizens. He likewise introduced many merit
plans, as sweeping the streets, forming a militia,
ning a public library, and establishing a hospital
was early elected a member of the Provincial Asse
His printing business steadily grew and his fortun
it, until in 1748, when forty-two years of age, he fel
self strong enough to decline business, and sold his
to his partner, David Hall, on easy payments.

BENJAMIN FRANKLIN.

Before he had been long in the province he was led to study its anomalous condition. Its land was held by the heirs of William Penn. To do what was requisite for the comfort and security of the colony it was necessary to lay taxes, yet the Penn family strenuously objected to paying what the assembly thought was its share. There was therefore continual bickering between the governor and the popular party, which was nearly always in the majority, and of which Franklin before long became the head. The examination which he was forced to make of the authority of the governors as derived from Penn and the crown led him to the belief that colonies settled by Englishmen were united to Great Britain through the crown only, that the parliament had no authority in them, and the king only as much as he had in England. Until just before the declaration of separation from Great Britain all discussions of the rights of Englishmen in the colonies were based upon the lines thus supplied by Franklin. He was an active member of the General Congress held at Albany in 1754, called to concert measures against the French and Indians, and to it he presented a paper advocating a limited union of Americans which in many respects was much like that afterwards adopted by the United States. In 1751 he was made deputy postmaster-general, introducing many reforms. In 1757, in consequence of disputes with the proprietaries, he was sent to England by the colony as its agent, and with intervals he continued there until the outbreak of hostilities with the mother country. For many of those years he was also the agent of several of the other colonies. His reputation had grown to be very great, and his acquaintance with leading men in Great Britain was very extensive, when in 1764 he opposed the stamp act. Two years later it was arranged by those who were ready to vote for its repeal that he should be examined before the House of Commons as to the condition and temper of America. The examination was in the hands of his friends, and Franklin himself arranged the interrogatories. Perhaps no display before a legislative body was ever more effective than this. His unrivaled knowledge of the subject, the fertility of his illustrations, and the aptness of his replies compelled acceptance of his conclusions. The part he took in the transmission of Hutchinson's letters to the assembly of Massachusetts drew upon him the immediate displeasure of the British ministry, and at a meeting of the privy council he was assailed with the coarsest invective by Wedderburn, the attorney-general, for his share in the act. In 1775 he returned home and was immediately elected a member of the Congress. He signed the Declaration of Independence in 1776 and was one of the members of the subcommittee which drafted it, the other two members who were most prominent being Jefferson and Adams. In that year he was sent to France as commissioner plenipotentiary, and had the happiness of negotiating a treaty with that country in 1777. All through the war he performed the greatest services for America. Upon his influence with the court of France depended the sums of money which could be obtained for our necessities. He was a most notable figure there, with his plain, Quaker-like dress, his benignant manner, and his great intellectual activity. With Adams and Jay he signed the treaty of peace with Great Britain which acknowledged our independence in 1783, and the year after he returned home.

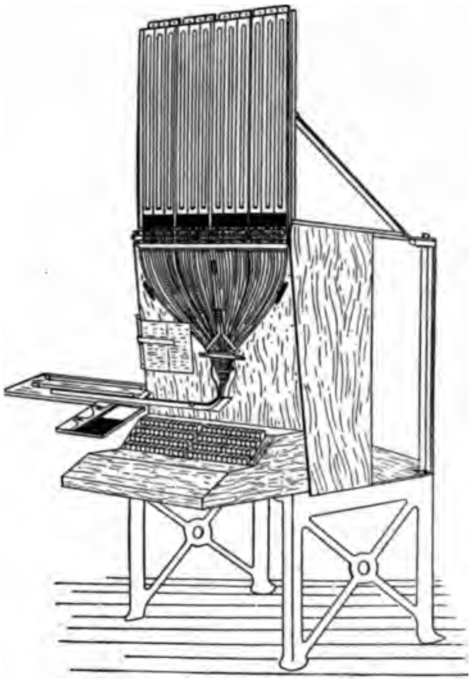
The love for writing which induced Franklin at the age of sixteen to write under the title of Silence Dogood for his brother's paper continued a strong passion all his life. He poured forth letters, pamphlets and newspaper articles upon every question which in that age interested mankind. Many of these decidedly influenced the actions of men; none were hurtful, and all were interesting. His writings are the only ones produced in America before the Revolution which are still read. His Autobiography, prepared in his old age, seems likely to last as long as the language. His reputation was likewise very high as a scientific man. The discovery of the identity of lightning and electricity was one only of the many facts added by him to our common knowledge. He had been led up to this by a long course of previous study. As a printer he ranks high. In his later years in this occupation, when he had means to buy new type, he produced some very handsome works. He had a private printing-office at his residence near Paris, and brought over from that city type-founding tools so that his grandson could cast letter when it was needed. The pica now used as a standard for the point system in America is based upon the gauges in the tools he thus imported. He published the first magazine issued in America. It was entitled the General Magazine. A number of his apprentices were started in business for themselves by him in places away from Philadelphia, nearly all being successful.

After Franklin's return from France he was elected president of Pennsylvania and also one of the delegates to the convention which formed the Constitution of the United States. Shortly after the new government was put into operation, or on April 17, 1790, he died. The first part of his Autobiography was published the year after his death, the second in 1798, the third in 1818, the fourth in 1828, but the whole was not issued until 1868. There are two full editions of his works. Sparks's is the older and less complete, and Bigelow's the newer. Each is in ten volumes. It is probable, however, that within twenty-five years enough more of his writings will be discovered to require two more volumes. A bibliographical list of the works of Franklin or relating to him has been compiled by Lindsay Swift for the Boston Public Library, and an excellent Bibliography of Franklin has been published by Paul Leicester Ford. Valuable collections relating to Franklin are in the Boston Public Library, the Historical Society of Pennsylvania, the Library of Congress, the Lenox Library, the British Museum, the Department of State at Washington, the Metropolitan Museum of New York, the American Philosophical Society of Philadelphia, and the library of the late Gordon L. Ford of Brooklyn. Many societies publish pamphlets containing reports of the speeches delivered in honor of Franklin upon each anniversary of his birth, and there are monuments in Boston, Washington and New York in public places. There are more original portraits extant of him than of any other American. A valuable biography of Franklin in two volumes was published by James Parton more than twenty years ago; it contains many facts not in the Autobiography, which closes while Franklin was still comparatively a young man, and enriches the whole with many additional circumstances. There are besides a dozen other lives, most of them without much value. Hundreds of towns and counties in the United States have adopted the name of Franklin, and it has also become a common given name for individuals.

Franklin, James, an elder brother of Dr. Franklin, from whom the latter learned the printer's art, was born in England and served an apprenticeship there. He came to America from London in 1716, and soon entered upon business in Boston. In 1719 he began printing the Boston Gazette, the second continuing newspaper published in that city. After seven months the proprietor took it away, but on August 6, 1721, Franklin published the New England Courant at his own risk. The paper spoke too freely to please those who controlled public sentiment, and the Rev. Increase Mather soon denounced it. Before the first year of its publication expired Franklin was arrested and thrown into jail by the government for publishing libels, and in 1723 he was forbidden to publish the Courant or any other journal of like nature unless it had first been supervised by the secretary of the province. To avoid this order it was afterwards issued by Benjamin Franklin, then an apprentice to his brother, who had his indentures returned to him for this purpose. It was for this journal that Dr. Franklin first began writing, and it was from his brother that he ran away to New York and

Philadelphia. He appears to have worked for James Franklin about three years in all. The latter removed to Newport, R. I., in 1732, and died there three years after. He had previously been reconciled to his brother.

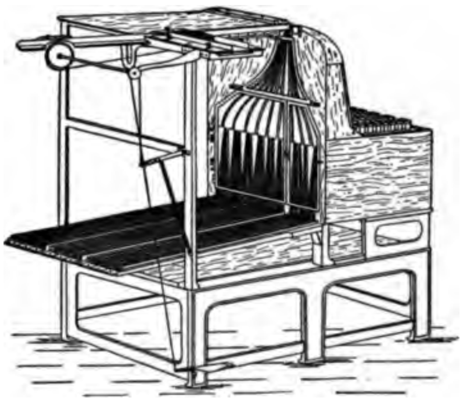
Franzband (Ger.).—Full leather, with handsome finish and clear, lettered titles; formerly used only for calf binding, but now generally applied to any better grade of leather binding.



FRASER COMPOSING-MACHINE.

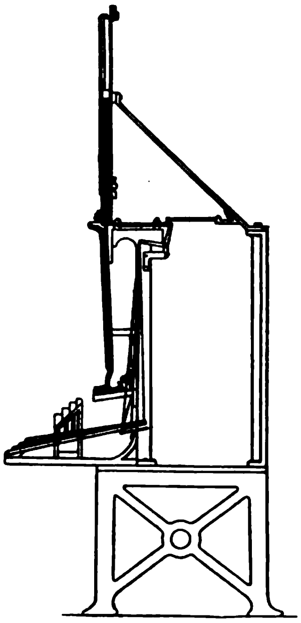
Fraschetta (Ital.).—A frisket.

Fraser's Composing-Machine.—A typesetting machine manufactured at Edinburgh, Scotland. Only the ordinary type is used, no special nicking being necessary. Each sort or variety of type is by itself in a tray twenty-eight inches in length. Each tray is three inches broad, and contains eight grooves or channels running the entire length. The type rest on their sides, with their faces towards the operator. The whole upper part consists of twelve of these trays, each being easily put in or removed. When typesetting begins the depression of each key throws out a type, which then passes through a groove downward. There are a large number of grooves, but all converge at the bottom, where there are three fluttering, thin steel plates, which break the fall, and finally move the letter into line with those which have fallen before. A pusher moves along the type as it is required. The extreme length of the line is twenty-four inches, and it can either be spaced by the operator at the machine or passed to a galley, to be justified away from the composer.



FRASER DISTRIBUTING-MACHINE.

The distributing-machine which accompanies this separates the line of type into its parts by the motion of keys, and is not aided at all by special nicks. The operator sees the letters before him, strikes the proper keys, and they fall into the proper grooves. It distributes only seventy-two letters, experience having shown that the other characters occur so infrequently it is hardly worth while to have grooves for them, and they are consequently all thrown together into one common channel, afterwards to be separated by hand. The letters pass from the line into a place where they are separated by thickness and by the key motion, finally passing into the groove which communicates with the groove of the trays placed in the composing-machine. The speed of the latter machine is just about as great as that of the distributer. These machines are not expensive, not liable to get out of order, and have been used for many years with satisfaction in a large office in Edinburgh. Four sizes of type can be set by the same machine, and no power is required.



SECTION OF FRASER COMPOSING-MACHINE.

Frasqueta (Sp.).—Frisket.

Frate (Ital.).—A friar or light spot.

Frederick III., Emperor of Germany, was in power at the time of the invention of printing. His reign lasted from 1440 to 1493, his life thus being contemporaneous with that of Gutenberg. He was born in 1415. He does not appear to have given any encouragement to the inventors, although, as Archdeacon Coxe remarks, he was a monarch "deeply versed in the learning of the times; was much absorbed in his passion for letters and sedentary occupations, and attached to the study of antiquities and heraldry." The only honorary reward, Hansard says, "which the discovery ever met with was conferred by the latter of these sciences, in granting to one Mentilius a title of nobility. The chief and only merit of this person appears to have been that of becoming rich by adopting the art, after it had been established, as his own, for the diploma contains not a word on the invention of printing. The same emperor also permitted printers to wear gold and silver, and granted coat-armor to the Typothetæ and Typographi to perpetuate the honor of the discovery. This armorial bearing is still (1825) claimed by the professors of the art in Germany." It is from the arms thus granted to the Typothetæ of the city of Nuremberg by Frederick that the Typothetæ in this country derive their insignia.

Free Subjects.—Those prints which are objectionable from their indelicacy.—*Maberly.*

Freeman's Oath.—The initial production of the printing-press at Cambridge, Mass., when it was established there two hundred and fifty years ago.

French Canon.—The name of a type formerly used in England, which was a little larger than four lines of pica. The French name is gros canon; German, Missal; Dutch, Parijs romein; and Italian, canone.

French Finish.—In bookbinding, having upon them bands only, with no tooling whatever; extra clear leather, simply titled in gilt.

French Furniture.—A former name in England for metal furniture.

French Government Printing-Office.—Every branch of the printing trade, from type-founding to bookbinding, is represented in this office in Paris. On the staff there are, besides the director and assistant director, fourteen managers, deputy managers and foremen, and forty clerks, and it is estimated that the total number of persons employed is about one thousand. About two hundred and fifty compositors are engaged, fifty usually upon works in Oriental languages. The cases used are double, similar to those in England and the United States, instead of the single case, with both capitals and small letters in it. The original alphabetic arrangement of the lower case is shown more clearly here than by any other case known. Beginning at the left hand the upper tier of large boxes runs b, c, d, e, *, *, f, g, h, and the next tier l, m, n, *, o, p, q. In 1879 there were fifty hand-presses and one hundred hand-press men, with forty-four power-presses. In this department there are about two hundred hands. Some women are employed here; they get about five dollars a week. There is a type-founding department. Here a wonderful number of punches and matrixes are preserved. In the Roman fonts certain letters are made with a distinctive mark to them, so as to distinguish them from those used in private establishments. Lithography, copperplate work and stereotyping are also done, as well as ruling. Many complaints are made in France that the government printing-office, in addition to handling official work, takes books which otherwise would be executed in other printing establishments, and thus deprives private printers of a portion of the revenue they might naturally expect. This printing-office was founded by Louis XIII. in the year 1640. He acted under the inspiration of Cardinal Richelieu. Sébastien Cramoisy was the first director, and the first book printed, which was in Latin, was the Imitation of Jesus Christ.

French Language.—This language is found in the printing-offices of America to be more commonly used in single words and quotations than any other outside of English, and consequently needs much study by compositors and proof-readers. Its literature, taken as a whole, is more considerable than that of Germany, as much writing was done in it while German was still regarded as a barbarous dialect, and German and English scholars thought it more necessary to understand French well than to be proficient in their own tongues. Frederick the Great prided himself more upon his French than upon his victories, although the battles produced marked effects upon the history of the world, while his writing, although fluent, was characterized by Voltaire as incorrect. Gibbon thought of writing his Decline and Fall in French, and Sir William Jones composed several works in it. It is now the language of diplomacy, of war and of cookery; it is much more abundant in its productions than Spanish or Italian, and it is clearer and neater in its forms of expression than any of the Germanic tongues. These causes alone, independent of the vast accumulations of writings of previous ages, must tend for many years to make a study of it highly important.

Modern French results from the decomposition or disintegration of ancient Latin. It is very doubtful whether the ordinary people of Rome ever spoke a language so highly complicated in its grammar as we now find the remains of classical Latin to be, and some have even asserted that the common language of the lower classes bore a closer resemblance to modern Italian, with its prepositions and articles, than it did to the speech of Cicero and Cæsar. At the time of the downfall of Rome, in the fifth century, the Roman legions were in many lands. In some they left very little impress upon the common speech; in others, as in Spain, Portugal and France, the Latin thus spread became the speech of the majority of those who dwelt in these countries. So far as we are able to tell by ancient writings the inflected form continued in use in each land for four or five centuries, and then diverged into something more national. Latin, after a time, ceased to be spoken, except in the church and among scholars. Celtic and Germanic words were added in France; the adjective, instead of following its noun, generally preceded it; articles derived from the Latin demonstrative pronouns were introduced; prepositions took the place of case endings, and affixes were generally dropped. An example of rustic Latin, the oldest form of French, translated into modern French and into English, is here given. It is the oath of Louis the German in the year 842:

Pro Deo amur et pro Christian poblo et nostro
Pour de^{2} Dieu^{3} l'amour^{1} et pour Chrétien^{3} le^{1} peuple^{2} et notre
For of^{3} God^{4} the^{1} love^{2} and for Christian^{2} the^{1} people^{3} and our

commun salvament dist di en avant, in quant Deus
commun salut dorénavant, en tant que Dieu
common salvation hereafter, in so much as God
(to the degree that)

savir et podir me dunat, &c.
savoir et pouvoir me donnera, &c.

to know and to be able me^{3} will^{1} give^{2}, &c.
(knowledge) (ability)

Two principal dialects were soon developed, distinguished from each other by the name which each gave to the word yes. That south of the Loire was called the Languedoc, and that of the north Languedoil. The latter finally became the chief tongue, but to this day vast numbers of Frenchmen do not understand book French. Their languages differ widely, both in vocabulary and grammar. Attention has within thirty years been called by many scholars and poets to the beauty of the Provençal tongue, the modern name of the ancient Languedoc, and to several romantic poets who have recently been produced in the South of France. Literary French began to be developed at the beginning of the twelfth century. Froissart's Chronicle is believed to be the first extensive work in genuine French. Montaigne and Rabelais enriched the vocabulary as well as the forms, and many modifications resulted from the wars, the Reformation and the influence of the printing-press. Since Paris has had the art of printing the language has altered much in its spelling, and accents have been much more largely introduced. The Lord's Prayer in Old French is as follows:

"Sire Pere, qui es ès Ciaux, sanctifier soit li tuens nons; avigne li tuens Regnes; soit faite ta volantè, si comme ele est faite el ciel, si soit ele faite en terre; nostre pain de chascun jor nos done hui; et pardone nos meffais, si come nos pardonnons a cos qui meffait nos ont; sire ne soffre, que nos soions tempté par mauvesse temptacion; mes sir delivre nos de mal."

Modern French thus has it:

"Notre Père, qui es aux cieux, ton nom soit sanctifié; ton règne vienne; ta volonté soit faite sur la terre comme au ciel; donne-nous aujourd'hui notre pain quotidien; pardonne-nous nos péchés, comme nous les pardonnons a ceux qui nous ont offensés ; et ne nous induis point en tentation, mais délivre-nous de mal ; car c'est à toi qui appartient le règne, la puissance, et la gloire. Amen."

The vocabulary of French is derived in the first place from the language of Rome in classical days ; but many of the words which were then rarely used in composition, and of which only a very few examples are known, were the roots of words at present much used in France. The changes from both are most apparent when the middle consonant is struck out, as in apôtre, beaux and frêle, from apostolus, bellus and fragilis, and when the final letters are gone, as in fait, figue, dette and nu, from factum, ficus, debitum and nudus. One consonant is changed for another, extraneous letters are forced in and prefixes are added. There are a large number of Germanic words and some of Celtic derivation. Greek added considerably to the vocabulary, both in early times and after the revival of learning. Like all other languages, French has borrowed much from other sources in late years ; theological terms from Hebrew, musical ones from Italian, and commercial and naval terms from English and Dutch are numerous. Sporting words have chiefly come from English.

French literature is very abundant in all light and graceful works, and in those in which a clear exposition of any particular matter is desired. Among those who wrote in the reign of Louis XIV. or before were Malherbe, Bossuet, Corneille, Descartes, Molière, Pascal and Racine. Before the French Revolution and contributing to it by undermining the faith and destructively investigating the commonly accepted views of the world in religion and sociology were Voltaire, Rousseau, Montesquieu and Buffon. During the Revolution and the Empire Madame de Staël and Châteaubriand were the most notable writers, Delille being the poet of the same age. At the time of the downfall of Charles X. and the placing of Louis Philippe upon the throne a new school of writers protested against the fetters imposed upon the language and upon literary construction by the authors of the periods of Corneille and Voltaire as interpreted by the Academy, and dramas were produced with the same disregard of time and unity of place that were to be found in English dramatic works, while other writers began adding to the vocabulary sanctioned by the Academy and introducing new forms of sentences. Of these authors Victor Hugo was the most remarkable. Lately France has produced many skillful dramatists, graceful versifiers, tender poets, interesting novelists and thoroughly able historians. Criticism is one of the arts in which the French excel.

French is nowhere the possession of a large number of people away from France itself. That country has had many colonies, and its language has always been current wherever civilized man was found ; but the greatest population speaking this tongue away from the mother country is in Canada, where over one million of people employ no other language. Some graceful poets, like Fréchette, adorn that land. It has many newspapers.

The approved modern dictionaries in French are those of the Academy and Littré, both large and expensive works. The most usual French and English dictionary is that of Surenne. John Bellows, of Gloucester, England, has compiled a pocket dictionary which is a wonder of condensation and is besides very accurate. For learning the language an Ollendorff is perhaps the best method. Either Virtue's or Jewett's, published by Appleton, is as good as any of those arranged on this plan. After one of these has been completed a grammar on the scholastic method should be studied, and then an average of an ordinary volume should be read every month or two for years.

French Metal Blocks.—The metal mounting cores or risers used for stereotype plates.—*Jacobi.*

French Metal Furniture.—Metal furniture used in place of wooden—originally a French idea.—*Jacobi.*

French Pins.—Small wire nails or brads used for fastening plates to blocks. An expression used in England.

French, Printing in.—The French characters differ from ours in having no w and in having a great number of accents. It is true that w is occasionally used, but always in foreign words. The sorts for each of the letters run in the following proportion : Ç Ê K Æ Œ W Ç Ê K Æ Œ W, 25 ; æ w ë Ï Û Y Z È Y Z ^{t} ^{i} ^{d} * [§, 50 ; È X É X, 75 ; ç k œ É J B F G H J Q ^{l} ^{m} * ? !, 100 ; ﬁ î ô û B F G H Q C M P V (, 150 ; M P V A D L N O R S T U 6 7 8 9 • ^{r} : —, 200 ; â ù C D N U I 3 4, 250 ; y z ê A I L O R S T 2 5 ; », 300 ; ﬁ E 1 0, 350 ; °, 400 ; E, 450 ; j x à è, 500 ; b f g h v ' -, 1,000 ; q, 1,200 ; é, 1,500 ; . p, 2,000 ; c m, 2,500 ; d, 3,000 ; l o, 4,500 ; a n u, 5,000 ; i r t, 5,500 ; s, 6,500 ; e, 10,000. Together, this font will have about 100,000 letters, and will weigh in pica of a large size 200 kilograms, or about 410 pounds. To a hundred kilograms ten kilograms of spaces and ten of quadrats should be added. The lower-case e is much the most used, having half again as many letters as s, the next used, and nearly twice as much as either i, r or t, the next in frequency. In English e has only one-third more letters than t, the next used, and one-half more than each of the next five. A peculiarity of French fonts is that there must be several superior letters, to use in places like M^{lle}. The short & does not properly form a portion of the font. Another peculiar sort is the guillemets, or quotation marks, like « ». The spaces begin at one point. Then follow one and a half points and two points, and they rise by half points until they reach the thickness of an en quadrat.

French type was the first cast on a mathematical system of proportion. As in all other countries, the larger sizes were first made, and then the smaller, but the latter were added without much regard to proportion with the existing sizes. In 1737, Fournier, the type-founder, conceived the idea of introducing regularity in the dimensions of type, and made each size one point, or the seventy-second of an inch, larger than the nearest smaller size. The system obtained some currency, but was not generally adopted. In 1811 Didot brought this theory further into use, with some modifications. His type was larger than that employed by Fournier. The basis is the type called Cicéro, which is considerably larger than our pica, and is only a very trifle smaller than thirteen points on the American system.

The old and new names, with their American equivalents, which are used because more definite than English sizes, are shown upon the next page.

The French face differs considerably from our own, and bears much resemblance to that of Italy and Spain. Almost every letter in some of the fonts differs from the English. In the excellent book on typography from which the diagrams of cases have been taken, that of M. Daupeley-Gouverneur, there is a larger hollow in the e ; the o is larger, the l longer, the b and q have widely different serifs, the double letters do not have the f make a perfect join at the top with the other letters, and throughout the whole there is adherence to other standards than our own.

The two cases shown are both used largely, the old form, or double case, in the country, and the new form, or two cases in one, in the city of Paris. The government office uses the double case.

The internal economy of a French printing-office differs much from that of an office in the United States. The foreman of each department is known as the prote. He has under him in the composing-room the requisite number of weekly or conscience hands, and as many piece compositors as will do the work. The hours of labor are ten. In some establishments the men are paid every week, but in others every two weeks. Many women are employed in doing work performed in America by boys and men, as, for instance, cleaning presses and washing rollers. There are a large number of apprentices, compared with the roll of journeymen, and in some places a technical school is kept up to give the boys a better education and a better theoretical acquaintance with the art. They receive very little compensation, the usual time being three or four years. Proofs are read almost entirely by collation, reading-boys being hardly ever employed. As a rule the French workman is a sober man. Trades unions exist in all of the principal towns.

In French typography it is considered that a more liberal margin is allowable than is the custom in England or America. Books are consequently printed with a smaller type-page than here. The title-page is generally preceded by a bastard title on the recto of the preceding leaf, and sometimes by a little advertisement or notice in the centre of the verso of the first leaf. The title employs larger type than in England or America, generally in condensed letter, spaced; but whether condensed or not, it is larger in the principal lines of French titles than in English titles. The body marks are also blacker than is customary here. The preface is usually a size larger than the text, and double leaded, after which may come the table des matières, but it is usually at the end. The distinction between an index and table of contents does not seem to be very clearly noted, and a real index is an uncommon thing in a French book. It is not the rule to sink the beginnings of chapters or the subtitles to the same extent as is followed in this country. Newspapers have the upper part of one or two pages divided from the lower part by a cross rule. Underneath this is the feuilleton or novel, which forms a part of the journal. No newspapers attain the immense proportions of some in England and America, although circulations are very large. It is said one journal prints 800,000 daily.

New Name.	Old Name.	English Translation.	No. of Points American System.	American Equivalents.
3. Trois	Diamant	Diamond	3	Half Minionette.
4. Quatre	Perle	Pearl	4¼	Diamond.
5. Cinq	Parisienne or Sédanoise	Parisian or Sedan	5⅜	Agate.
6. Six	Nonpareille	Nonpareil	6⅜	Minionette (small).
7. Sept	Mignonne	Minion	7½	Minion.
7½. Sept et demi	Petit-Texte	Little Text	8	Brevier.
8. Huit	Gaillarde	Wanton	8½	Bourgeois.
9. Neuf	Petit-Romain	Little Roman	9⅝	Long Primer.
10. Dix	Philosophie	Philosophy	10¾	Small Pica.
11. Onze	Cicéro	Cicero	11¾	Pica (small).
12. Douze	Saint-Augustin	St. Augustin	12⅞	Double Minionette.
13. Treize			13⅞	English.
14. Quatorze	Gros-Texte	Great Text	15	Columbian.
15. Quinze			16	Great Primer (small).
16. Seize			17⅛	Great Primer.
18. Dix-huit	Gros-Romain	Great Roman	19¼	Paragon.
20. Vingt	Petit-Parangon	Little Paragon	21⅜	Double Small Pica.
22. Vingt-deux	Gros-Parangon	Great Paragon	23½	Double Pica.
24. Vingt-quatre	Palestine	Palestine	25⅝	Double English (small).
28. Vingt-huit	Petit-Canon	Little Canon	30	Double Columbian.
36. Trente-six	Trismégiste	Trismegistus	38½	Double Paragon.
44. Quarante-quatre	Gros-Canon	Great Canon	47	Canon.
48. Quarante-huit			51⅜	Five-line Long Primer.
56. Cinquante-six	Double-Canon	Double Canon	59⅞	Five-line Pica.
72. Soixante-douze	Double-Trismégiste	Double Trismegistus	77	Four-line Paragon.
88. Quatre-vingt-huit	Triple-Canon	Triple Canon	94	Eight-line Pica (small).
96. Quatre-vingt-seize	Grosse-Nonpareille	Great Nonpareil	102¾	Eight-and-a-half line Pica.
100. Cent	Moyenne de Fonte	Limit of the Casting	107	Nine-line Pica.

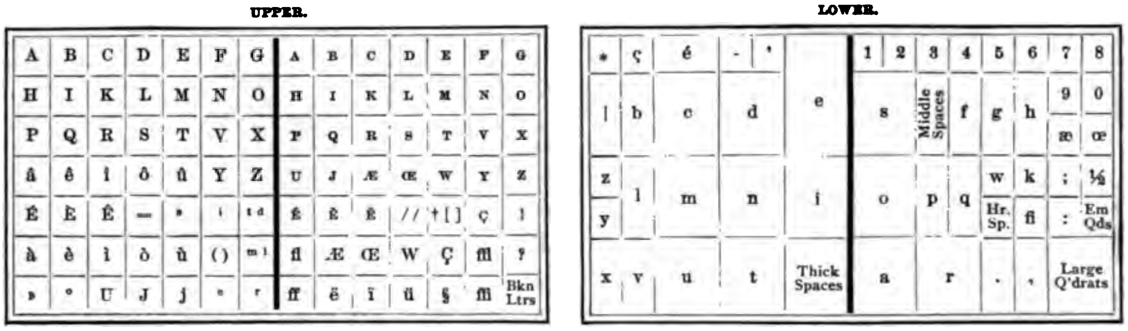
SIZES OF FRENCH TYPE, WITH THEIR AMERICAN EQUIVALENTS.

Divisions in French are made, as they are with us, upon syllables. Three divisions in succession are forbidden. A single letter does not make an allowable division, even when the article or another word is joined to it, as in l'é- | légance, d'a- | vance, qu'a- | vant. A mute syllable cannot be thrown over, as emblè- | me, savan- | tes, mar- | bre, ils vin- | rent. It is preferable to divide pu- | bliques, ils pa- | raissent, instead of publi- | ques, ils parais- | sent. Two letters do not make a division, except in a very narrow measure, and then only when the letters are thick. Such divisions as il- | lettré, li- | mace, fi- | ligrane are inadmissible. When unavoidable divisions may be made with words such as en- | fantin, pa- | villon. Two letters, like par- | mi, rele- | vé, confon- | du, cannot be thrown over. Neither can a small word, compounded with the word preceding, as prenez- | le, goûtez- | la, ceux- | ci, ceux- | la. Divisions cannot take place between two vowels, as inqui- | étude, lou- | ange, propri- | étaire, situ- | ation, thé- | âtre, although the two vowels are pronounced separately. When, however, the vowels which thus come together form the end of a word or prefix used separately and the beginning of another word, also used separately, this rule is not operative. Examples are extra- | ordinaire, anti- | orléaniste, archi- | épiscopal. These are better divisions than extraor- | dinaire, antior- | léaniste, archié- | piscopal.

The x, representing cs, and the y, representing two i's, belong as much to the syllable which precedes as to that which follows. Thus they can be annexed to either line, as Alex- | andre or Ale- | xandre, fix- | er or fi- | xer, prévoy- | ance or prévo- | yance, roy- | aliste or ro- | yaliste. The compound words, ending with an apostrophe showing elision, can be divided in that place, but the hyphen is indispensable, as in grand'- | mère, grand'- | chose, à grand'- | peine. When it is necessary to divide between two words joined with a euphonic t this always goes over to the next line, as in ira- | t-il, presente- | t-on, affirme- | t-elle. Two words compounded so as to make another word are preferably divided upon the originals, as contre- | expertise, not contre-ex- | pertise; feld- | maréchal, not feld-ma- | réchal; morte- | saison, not morte-sai- | son; plus- | value, not plus-va- | lue. In the middle of a word, where there is a mute syllable, the division should be after the syllable rather than before, as in courte- | pointe, événe- | ment, frôle- | ment, particulière- | ment, instead of cour- | tepointe, évé- | nement, frô- | lement, particuliè- | rement. When a compound word is abbreviated, or two or more words which are hyphenized when at full length, hyphens are taken in the abbreviation. Thus ch.-l. is used for chef-lieu, c.-à-d. for c'est-à-dire, l'église St.-Laurent for l'église Saint-Laurent, J.-C. for Jésus-Christ. It will be noted that proper names which make one appellation are compounded, as Tite-Live. Certain words when brought together are hyphenized, as in the interrogative form peut-on, n'est-elle, est-ce. Others which belong to different parts of speech, and could not be compounded in

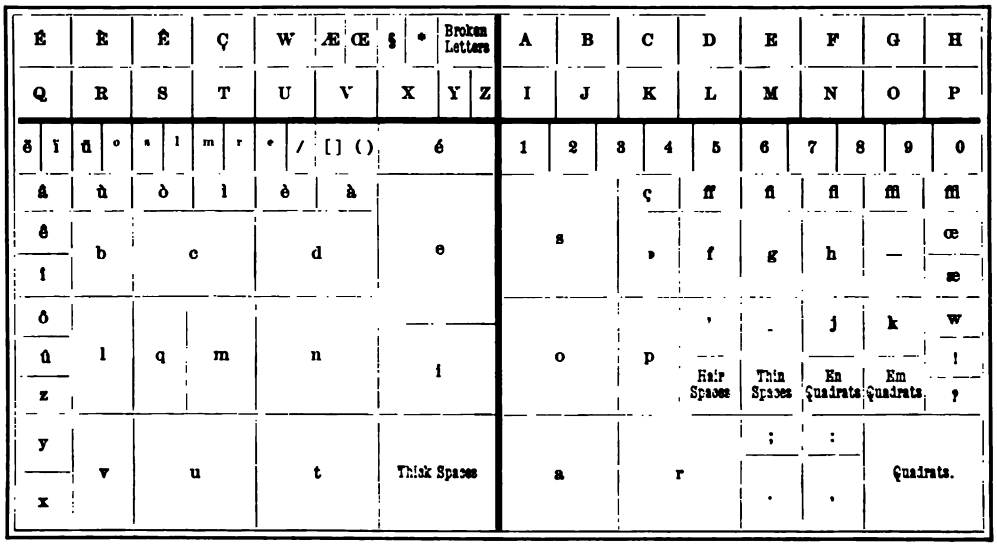
English, are joined, as dites-moi (tell me) and c'est-à-dire (that is to say).

The apostrophe is used freely when the last e of a word is to be cut off, and the next word is then frequently joined. The comma, semicolon, colon, interrogation and exclamation have a thin space preceding them, but the period does not. The em quadrat, customary after a full point in English, is lessened to a double thick space or to an en quadrat in French. French punctuation is more strictly a grammatical punctuation than English. In many places in English where a rhetorical pause occurs at a considerable distance from a grammatical pause a comma is inserted, although against strict rules. This is not done in French.


UPPER. LOWER.
A B C D E F G A B C D E F G
H I K L M N O H I K L M N O
P Q R S T V X P Q R S T V X
â ê î ô û Y Z U J Æ Œ W Y Z
É È Ê — • ' t d É È Ê // † [ ] ç !
à è ì ò ù ( ) m l fl Æ Œ W Ç ffl ?
» ° U J j ⁿ r ff ë ï ü § ffi Bkn Ltrs
* ç é - ' 1 2 3 4 5 6 7 8
| b c d e s Middle Spaces f g h 9 0 æ œ
z y l m n i o p q w k ; ½ Hr. Sp. fi : Em Qds
x v u t Thick Spaces a r . , Large Q'drats

THE OLD FRENCH CASE.

The following are the common abbreviations in French which cannot readily be discovered from the context: B^{on}, baron; c., centime; cent., centimètre; c.-à-d., c'est-à-dire (that is to say); cf. or cfr., confer (compare); C^{ie}, compagnie (company); C^{te}, comte (count or earl); J.-C., Jésus-Christ; m., mètre; m. à m., mot à mot (word for word); M^{is}, marquis; M^{e}, maître (master); N.-S. J.-C., Notre-Seigneur Jésus-Christ (our Lord Jesus Christ): n. s. or n. st., nouveau style (new style); P., père (father—*i. e.*, in the Church); p. e. or p. ex., par exemple (for example); p.-ê., peut-être (perhaps); p. p., publié par (published by); qq., qqc., qqf., quelques, quelquechose, quelquefois (some, something, sometimes); S. A. I., Son Altesse Impériale (his imperial highness); LL. AA. II., Leurs Altesses Impériales (their imperial highnesses); S. A. R., Son Altesse Royale (his royal highness); LL. AA. RR., Leurs Altesses Royales (their royal highnesses); S. E., Son Excellence (his excellency); LL. EE., Leurs Excellences (their excellencies); S. Ém., Son Éminence (his eminence); LL. ÉÉm., Leurs Éminences (their eminences); S. M., Sa Majesté (his majesty); LL. MM., Leurs Majestés (their majesties); S. S., Sa Sainteté (his holiness); s., siècle (age, century); v., vers (verse); vv., verses; voy., voyez (see, look); vfr., vieux français (old French); v. s. or v. st., vieux style (old style, in chronology).


É È Ê Ç W Æ Œ § * Broken Letters A B C D E F G H
Q R S T U V X Y Z I J K L M N O P
ĕ ĭ ŭ o s l m r e / [ ] ( ) é 1 2 3 4 5 6 7 8 9 0
â ù ò ì è à ç ff fi fl ffi ffl
ê î b c d e s » f g h — œ æ
ô û z l q m n i o p , - j k w ! ?
Half Spaces Thin Spaces En Quadrats Em Quadrats
y x v u t Thick Spaces a r ; : . , Quadrats.

NEW MODEL OF FRENCH CASE.

The common titles of respect to individuals, such as correspond to our Mr. and Mrs., take superior letters, but no period, as abbreviations. Thus they are printed M^{me} or Mme, M^{lle} or Mlle, M^{gr} or Mgr. First, second, third, and so on, are indicated by 1er, 2^{e}, 3^{e}, or I^{er}, II^{e}, III^{e}. This may also be done in small capitals. Primo, secundo, tertio are abbreviated 1^{o}, 2^{o}, 3^{o}. Per cent. is written 5%, 7%. Sizes of paper are abbreviated in-f^{o} or in fol., in-4^{o} or in-4, in-8^{o} or in-8.

The guillemet, or quotation mark, is used about as in English, although an interjection of a word or two may be made without requiring the closing of one quotation and the beginning of another. For instance, in French the following sentence is correctly printed, although the quoting is wrong in English:

"Eh bien, vous vous trompez, lui dis-je; j'ai l'intime conviction que vous vous trompez."

"Well, you deceive yourself, said I to him; I have a profound conviction that you are deceiving yourself."

Quotations down the side are sometimes used.

The parenthesis is used as in English, as well as the brackets. Notes are indicated by a superior figure with or without parentheses, or an ordinary figure between parentheses. Superior letters are used for notes to notes, or when a distinction between different kinds of notes is necessary.

The years of the French Republic (that after the downfall of Louis XVI.) are indicated by Roman numerals, as le 18 ventôse, an IV., le 13 vendémiaire, an IX.

The orthography of French words is not entirely settled. The Dictionary of the Academy is commonly recognized as the authority for printing-offices, but its influence is lessening. Lexicography has made many strides. The accents, which were devised originally to indicate difference in sound or in meaning, or the suppression of a letter, are very perplexing. Many words, for instance, take an acute accent in the edition of that dictionary of 1835 and a grave in that of 1877. Once collége, manége, siége and solfége were written; now they are written collège, manège, siège and solfège. The spelling of 1835 was dyssenterie, érysipèle, excedent; the more modern is dysenterie, érésipèle, excédent.

The Academy abstains from fixing the plural in many words, but the other dictionaries do not follow its rule. Certain words are spelled in two ways, as assujettir or assujétir, dévouement or dévoûment, gaieté or gaîté. One of these would be preferable. All the verbs which have the acute accent in the infinitive upon the next to the last syllable retain the same accent in the future and in the subjunctive.

We are indebted to John Southward for the following table of sizes of French papers used in printing:

Names.	Inches.	Names.	Inches.
Pot	12.2 × 16.5	Raisin, or Grand-Raisin	19.7 × 25.6
Poulet	8.6 × 11.0	Petit Jésus	21.6 × 27.5
Couronne	14.2 × 18.1	Jésus-Musique	22.0 × 27.5
Ecu	15.7 × 20.4	Grand Jésus	22.4 × 29.5
Coquille	17.7 × 22.0	Petit Colombier or Soleil	23.6 × 31.5
Cloche Normande	18.8 × 20.4	Grand Colombier	24.4 × 35.4
Tellière	13.0 × 17.3	Grand Aigle	28.8 × 40.0
Griffon	13.8 × 17.7	Grand Monde	35.4 × 47.1
Petit Raisin	12.6 × 17.0		
Carré	17.7 × 22.0		
Cavalier	18.5 × 23.6		

The sizes chiefly used are Jésus, carré and raisin. Poulet is the quarto of coquille after having been trimmed for making octavo letter-paper. Coquille is of the same dimensions as carré, but differs as regards make and surface. Coquille is a writing-paper, while carré is news and book. Coquille also signifies any hard-surfaced or writing paper. Petit and grand are no longer used in connection with raisin. The large sizes are not of uniform dimensions.

French Rules.—Short ornamental rules of either brass or type metal are generally thus designated in England.

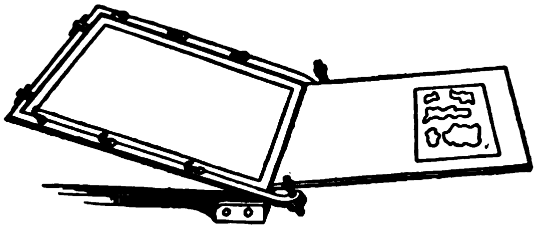
Fret.—When rollers crack or peel they are said in England to fret.

Friar.—A light patch in a printed sheet, caused by too little ink. It contrasts with a monk, which comes from too much ink. Both are occasioned by faulty distribution and rolling.

Friburger, Michael, one of the early French printers, began the art in Paris with Ulrich Gering and Martin Crantz. He was a German, coming from Colmar, and probably returned thither in 1478, as after that year his name no longer appeared on imprints.

Friser (Fr.).—To mackle.

Frisket.—A thin iron frame fastened by match joints at one end to the tympan, and destined to fold down upon the sheets when they are to be printed, preventing them from moving, and, with the sheet which is pasted upon it, from which the printed matter is cut away, designed to prevent them from smutting. It is used upon all hand-presses and upon the Adams press.



OLD GERMAN TYMPAN AND FRISKET.

Frisket Stay.—The piece of wood upon which the frisket is caught when it is thrown up.

Frisquette (Fr.).—Frisket.

Froben, John, a celebrated printer of Basle, Switzerland, whose name was sometimes Latinized as Frobenius. He was an apprentice of Amerbach, and remained in the craft from 1491 until his death in 1527. The first edition of Erasmus's Greek Testament was published by Froben. Large sums were spent by him in securing accuracy, and many learned men acted as correctors for his press.

Front Marks.—The lay marks on the board nearest the grippers.

Frontespizio (Ital.).—The title to a book.

Frontispiece.—The illustration facing the title-page of a work.

Frozen Out.—An old term used when the men were hindered from working by reason of extreme cold. This is obsolete, as offices are now thoroughly warmed by stoves or steam.

Fry, Edmund, a noted type-founder in London, who carried on business for many years in conjunction with his brother Henry, succeeding his father, Joseph Fry. Their foundry contained the chief part of the matrixes and punches in the learned languages which had been embraced in the foundry of James, and Edmund Fry, who was the most learned type-founder of the day, added much to it in this respect. He had originally been educated for the medical profession, but deafness, which came on early, prevented him from following it. In 1799 he issued a book under the title of Pantographia, containing considerably beyond two hundred alphabets, among which were thirty-nine varieties of Greek, for which he had characters in the house, and even after this he had many others made. In 1827 he produced a character for the blind; this was a Gothic in capitals and small capitals. His foundry was sold to William Thorowgood in 1828, and Dr. Fry died on December 22, 1835, being then at a very advanced age. His last years in business had not been prosperous. See for a portrait of Dr. Fry under SILHOUETTE.

Fry, William, of Philadelphia, Pa., esteemed the best printer of his day, was born in that city on February 13, 1777. His father was Joseph Fry, a lieutenant in the Revolutionary army, who died sixty years ago at the great age of ninety-three. While his mother was making her escape from the city at the entrance of the British army in 1777, her household effects, with the child, were placed upon a wagon covered with straw. One of the straws accidentally entered his eye and destroyed its vision irreparably. He received a good general education, extending, however, no further than the English

WILLIAM FRY.

branches. He developed a remarkably fine voice, soprano as a child and tenor as he grew older, frequently singing solos at popular concerts. He served his time as a printer, and in 1802 began business for himself as a bookseller at 36 Chestnut street. In 1806 he formed a partnership as a printer with Joseph L. Kammerer, with whom he had been associated as a manager in the charity schools. Mr. Fry was an excellent pressman, compositor and proof-reader, and his reputation had so increased that in 1807 his firm was selected by Joel Barlow to print his Columbiad. The design of this book was noble. The page was a quarto. The paintings for this were executed by the best artists of London, and the copperplate engravings were also done there and in France; the paper was made in Roxborough, at the Jones paper mill, each sheet being singly examined by the printer before it was wet down; the type, which was large in size, was made by Binny & Ronaldson, and every letter was scrutinized both by a member of that firm and by Mr. Fry. To insure correctness he offered one hundred dollars for each error found after he had revised it for press. The result answered expectations. It was the best printed book up to that time in America, and will compare favorably with any since executed. Fry made the ink, to do which properly he studied chemistry, and it still remains of its original blackness. He was indebted for the order to Robert Fulton, then a portrait painter, but afterwards the inventor of the steamboat, who was familiarly acquainted with Barlow. Shortly after this he studied Hebrew, so that he could print a Bible in that language. His business kept steadily increasing until 1825, much of the work of Mathew Carey coming to him after that eminent publisher discontinued his own printing-office. Fry & Kammerer separated in 1810, but they came together again in 1811. In 1814 Mr. Kammerer died. For much of the time after 1810 there were two printing-offices, one being in South Seventh street and the other near the debtor's prison. For a long time his establishment was the largest in Philadelphia, and at a period when bank-notes were partially executed by typography he was selected to do the work. He lost heavily at the beginning of the second war with Great Britain, and again between 1817 and 1819. In his place the Columbian press was first tried, and when it proved a success he ordered a large number. On July 5, 1820, appeared the National Gazette and Literary Register, of which Fry was the publisher and Robert Walsh, a literary man of taste and high literary reputation, the editor. It was reasonably successful, and about 1828 the book and job office was discontinued. Newer and more sensational journals came in, however, and about 1840 Fry resigned the journal to his sons. In 1843 Charles Stewart Fry, his fourth son, died, and after this he took very little interest in the business. William Fry died in serene old age on August 31, 1854. He was bred an ardent Federalist, afterwards becoming a Whig, and exhibited much interest in public questions. While still a very young man he was actively concerned in the organization of the Society for the Establishment and Support of Common Schools. With Roberts Vaux and James J. Barclay and some other young men of the time he laid the foundation of the first public school in Pennsylvania, and never ceased to agitate the question of public education until it became general under the laws of the State in 1836. Shortly before his death, in recognition of his services, he was elected president of the society which he had founded. He also took much interest in other schools. His sons attained high distinction. The eldest, Joseph Reese, was a scholar and editor of marked abilities. He was chairman of the military committee of the Union League Club of Philadelphia during the civil war. William Henry, the second son, composed the first American opera, and was the well-known critic and an editor of the New York Tribune for many years. He was also at one time editor-in-chief of the Philadelphia Ledger, and to him was most largely due the consolidation of Philadelphia. Edward Plunkett, the third son, experimented much in printing, and produced in 1841 a poster of Harlequin and Columbine in eight colors, up to that time unexampled in American typography. These sons inherited their talent as writers and musicians from their father, who was witty in speech and very skillful as a writer.

Fudge.—To make shift; to do work without the proper appliances.

Fuelle (Sp.).—Bellows.

Fuerte (Sp.).—Said of justification when the line is spaced wider than the measure.

Fuerza del Cuerpo (Sp.).—Size of the body (of type).

Fugitive Colors.—Designations of a class of inks which are not permanent in tone, and change or fade on exposure. See under Color and Ink.

Full Bound.—A volume completely covered with leather.

Full Case.—A case well filled with type.

Full Color.—When an ample amount of ink has been used in printing.

Full Face.—A kind of type on the Roman model, but with very thick body marks. See Title.

Full Form or **Page.**—A form or page with few or no breaks or white lines.

Full Frame.—A compositor having a regular situation is said to have a full frame.

Full Measure.—Type composed the full width of the stick, and not in half measure or third measure.

Full Out.—In England, to make a full line without indenting.

Full Page.—A page filled out from top to bottom, as distinct from a short page.

Full Point.—A common name for a period.

Full Press.—When two men work at a hand-press, in contradistinction to only one person working, when it is called half press. Obsolete.

Full Stop.—Another name for a period.

Fundament (Ger.).—The stone used in the bed of hand-presses.

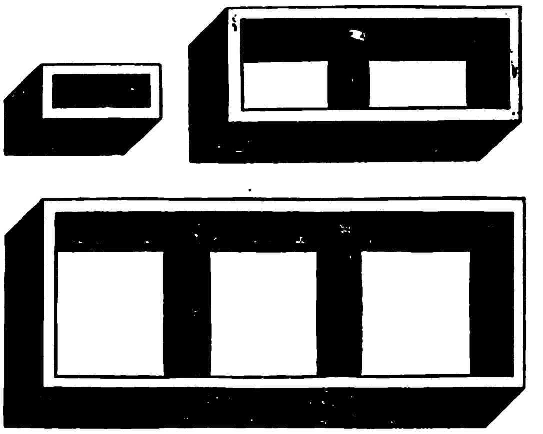
Fundición (Sp.).—Foundry; font (of type).

Fundir (Sp.).—To cast (type, rollers, &c.).

Funicella (Ital.).—Page cord.

Funzioni (Ital., functions).—That part of the work of the composing-room which is not composition, such as making-up, reading, &c.

Furniture.—This is the appellation generally given to all pieces of wood or metal designed to fill the spaces in a form between the chase and the type or between the pages. It may either be beveled or straight, in the former case making sidesticks and footsticks, and in the latter being divided into reglets and thick pieces. Wooden furniture comes in lengths of three feet, although longer strips can be procured if desired. Metal furniture does not often exceed a foot in length, and its most usual form is as labor-saving furniture or pieces cut to various determinate sizes, which can be joined to form longer pieces. Wooden furniture is of the same height as a chase, or five-eighths of an inch. In thickness it varies from the finest reglet of about a pearl to several inches wide. Beveled furniture is never as wide as the other, the largest pieces being only a little over an inch and a half. Two materials are used in the United States for wooden furniture, pine and cherry, the former being the cheaper. Mahogany was once employed. The wood is divided into the particular lengths wanted, usually in such a way that what is cut off can also be otherwise utilized. In printing-offices generally the ordinary mitre box must be used to hold the furniture when it is sawed, but large offices should have a circular saw. It cuts much better and much more quickly. In sawing with a handsaw, and using a mitre box, the saw is drawn towards the person when cutting, the wood not being likely to splinter so easily. To make up furniture for a new form the gauge is set to so many pica ems and new furniture is cut from it. Thus, in course of time all sizes can be found in the drawer. Old furniture should only be recut when it has become warped or when the ends have been broken. If the wooden pieces have often been wet and afterwards dried they are almost certain to be warped. A number of thin pieces of reglet should never be employed together for filling up a blank. They yield too much and too unequally. Large pieces are required. The regular lengths which should be cut are for sidesticks and footsticks, the length and width of chases, allowing for lock-up, and then descending by half inches until they are only a foot long. From this the descent should be to six inches by a third of an inch, and from this lower by pica ems. Reglets, meaning by the latter term two-line pica and less, and wider pieces, will rise similarly by ems, two ems and half inches. Perhaps as long a piece as will be needed will be forty inches, which will do for a single-sheet poster the long way. But ordinarily two pieces can be joined when required. Labor-saving wooden furniture is now common. Cases or racks for it are to be had in several different styles.

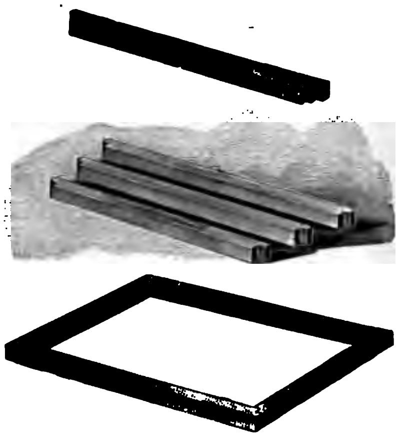


METAL FURNITURE.

Metal furniture first came into use in book offices for the greater certainty of register. When forms were locked up and put on the press they often would not register on account of the warping or expansion of the wood. Iron was used sixty years ago to obviate this difficulty, but it rusted. Type-metal furniture was later employed, the original form being like that of a very wide H, as: H. This was and is much used for gutters and headpieces; but about 1853 or 1854 a hollow furniture, covering more than twice the surface of the former device for the same weight and comprising thin and thick pieces, was brought out. The objection against these contrivances has been that they have rarely been dressed with accuracy, even by the best type-founders, and consequently cannot be depended upon for size. Metal furniture is made in pieces of 2, 3, 4, 5, 6, 8 and 10 picas in width and 4, 5, 6, 8, 10, 15, 20, 25 and 50 in length.

The English sizes for furniture are for double broad 8 ems pica wide; broad and narrow, 7; double narrow, 6; broad, 4; and narrow, 3.

Of late steel furniture has been brought into use. With this the whole space is not covered with furniture, but one piece is braced against another in such a way that comparatively few pieces will answer the purpose. The metal is one-half by five-eighths of an inch in dimensions, and the pieces are made in pairs, being so constructed that they will notch into each other. The lengths begin at two inches and rise to twelve, but larger pieces are made to order. This furniture averages twelve inches to a pound.

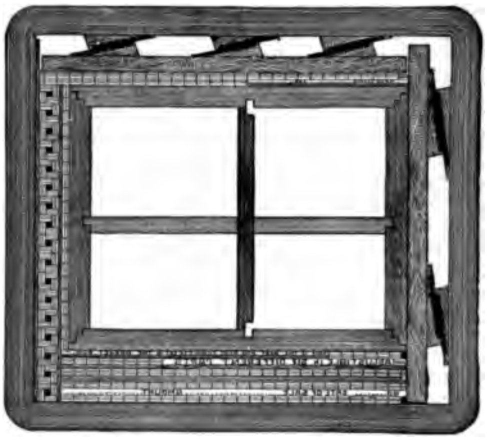


PIECES OF STEEL FURNITURE.

Houghton, in his Every-Day Book, published in 1846, in which the first suggestions for the systematic cutting of furniture appear, believed that the following sizes would be enough, in ems:

12
16
18
21
24
27
30
35
37
40
42
45
47
50
52
55
57
60
62
65
67
70
72
75
77
80
82
85
87
90
92
95
97
100
107
114
120
130

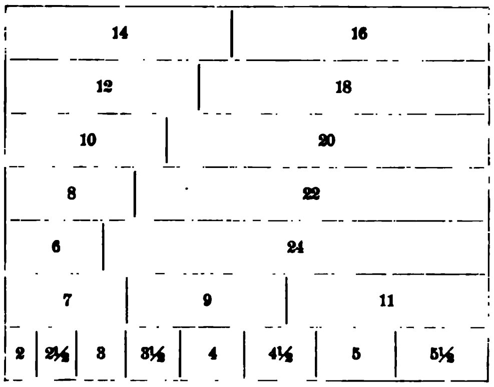
and a few longer pieces for use with posters. It is not necessary with sidesticks and footsticks to have both of them of the exact length; if none of the right length are at hand the sidestick may project half an inch or an inch



FORM WITH STEEL FURNITURE.

beyond the matter. The only precaution necessary to observe is that it does not bind against the footstick.

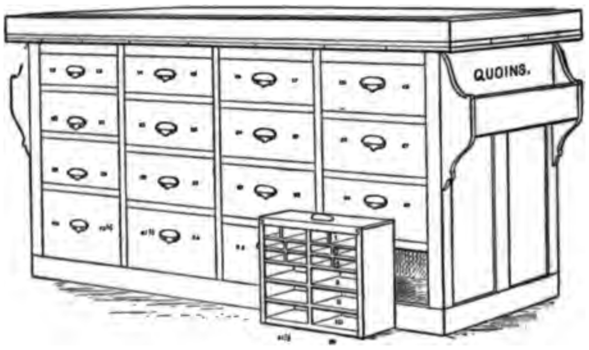
It is usual to stow away furniture in drawers of varying length, each being the exact size of the pieces intended to be placed there. While this plan is generally not carried out to its full extent, almost all offices try to approximate to it. Furniture drawers are made on the following described plan, or something similar to it. The width of that here shown is thirty inches, the thickness of the partitions being added, and the depth twenty-eight, the partitions being likewise added:



FURNITURE DRAWER.

Dearing divides his furniture drawer into twenty compartments, beginning with the smallest sizes on the left-hand side: 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60, 72, 84, 96, 108, 120, 144, 168, 192 and 216 ems. He places it under the stone.

De Vinne uses in his office a cabinet to receive furniture. It contains twenty-eight drawers; twelve on one side and sixteen on the other. They are of unequal depth, to suit different lengths of furniture, and every length stands on its narrowest end. If too long a piece is put in the drawer cannot be shoved in; if too short, its shortness is at once detected. This device effectually prevents the mixing of lengths. Each drawer is divided into two compartments of proximate sizes, like 12 and 18 ems pica, so that the compositor can select either length when the drawer is open. Each compartment contains longitudinal trays for six widths: Nonpareil, pica, two-line, four-line, six-line and ten-line. The pulling out and shoving in of the drawer does not throw the standing pieces into confusion, even when the compartments are only half full. All pieces of furniture are neatly planed and squared, and have the numbers of their length in picas stamped in their ends. These drawers contain sixty lengths of furniture; beginning with 12 picas, advancing by one pica up to 60 picas, and from 61½ to 70½ picas. Properly numbered on the outside, the compositor who picks up an odd piece on the stone knows at once in what drawer it belongs. The graduation of one pica each, from 12 to 60 picas, is found close enough for all purposes. No one has occasion to use a saw, for exact furniture is always at hand, and the pieces can be combined for lengths beyond 70½ picas. They are largely used not only for job-work, but as head-bolts and gutter-pieces in book forms and for the blanking out of open forms.



FURNITURE DRAWER.

Furniture Gauge.—The gauge used in measuring the furniture of a form before sending it to press. See Form-Gauge.

Furnival, Richard, was an English printing-press builder who was born at Halshaw Moor, near Bolton, Lancashire, in the year 1826. He served his apprenticeship as an engineer, and afterwards entered the employment of a celebrated firm of tool makers, becoming a foreman. In 1859 he began business on his own account in a suburb of Manchester. In 1866 he removed to Ardwick and in 1877 to Reddish, where a long range of workshops was erected. He manufactured presses, cutting-machines, hot-rolling machines and all other apparatus for use in a printing-office, his work being held in high esteem. He died on December 11, 1886.

JOHN FUST.

Fuss der Kolumne (Ger.).—Foot of the page.

Fust, John.—This historic personage, otherwise known as Faust, was one of the three persons living in Mentz between 1440 and 1460 to whom is ascribed the invention of printing, the other two being John Gutenberg and Peter Schoeffer. Fust was a wealthy goldsmith of that city, and appears to have been invited into partnership with Gutenberg that he might supply the money which was needed. The latter had been making experiments with types before he left Strasbourg in 1444–5. In 1450 the partnership began, Fust supplying 1,600 florins, and it lasted until 1455, when the goldsmith sued Gutenberg for the recovery of the money lent, which then had been swollen, by interest charges and other expenses, to 2,020 florins. The judges decided that a certain sum was due from Gutenberg, which he could not pay, and in consequence the whole of the printing apparatus which had been added since the partnership began fell into Fust's hands. The latter joined with him Peter Schoeffer, his son-in-law, and carried on business until the taking of Mentz in 1462, when the art was spread abroad. Between 1462 and 1464 there is no known work from the press of Fust and Schoeffer. In 1462 Fust took the Bibles which they issued in that year to Paris, from which, perhaps, arose the legend about Faustus and the Devil. See under Devil. In 1465 they published an edition of the Offices of Cicero, and republished it in 1466. Soon after this last date Fust made another journey to Paris, where he died, as is commonly believed, from the plague. On October 30, 1466, a mass was celebrated for him.

The question of the exact share which John Fust had in the founding of the new art will not be discussed in this place. Under Gutenberg, John; Invention of Printing; Koster, Lourens Janszoon, and Schoef-

FER, PETER, will be found the details of the history, so far as known, and the arguments for and against Fust's part in the invention. For a long time Fust was said to have himself acquired a knowledge of printing from Koster, and to have conveyed his information to Mentz. This story is owing to Junius, who declares that a certain John was employed in Holland to assist the printer in Haarlem. He was bound by oath not to reveal the secrets of his business, yet in spite of this he seized the first favorable opportunity, that afforded by the festivities on Christmas Eve, when he flew into the closet where the types were kept, packed up the instruments used in making them that belonged to his master, and which had been constructed by his own hands, and slunk away from the house with the booty. He went first to Amsterdam, thence to Cologne, and finally to Mentz, where he reaped an abundant reward. Junius names the books he printed in 1442 or 1441, which are not now known to exist, and which are twelve or thirteen years earlier than anything from Gutenberg's press of which the date can be determined. This connection of Fust with the matter is now abandoned by all. The wealth of the known Fust, the improbability that printing existed in Haarlem so early, the immense load of wooden blocks which Fust would have had to take away, and the futility of going to Amsterdam must be evident. If types made of wood alone were needed any skillful workman, with chisel, knife, saw and plane, could do as well as Koster had done, with the exception perhaps of neatness of face. His practical experience in printing was enough. The material was everywhere. Tools could be bought for a few florins, and any carpenter could construct a press.

Fust appears to have been a skillful man of business, while Gutenberg was not. The partnership between Gutenberg and Fust was for five years, in which time the work contemplated by the latter was to be completed. This was undoubtedly one of the Bibles. For the purposes of this partnership, which were not specified, Fust was to advance to Gutenberg 800 guilders, at 6 per cent. interest. The tools and materials made by Gutenberg for the uses of the partnership were to remain mortgaged to Fust as security for this loan of 800 guilders, until the whole sum should be paid. When the tools and materials were ready Fust was obliged by his contract to furnish Gutenberg with 300 guilders every year to provide for the payment of the paper, vellum, ink, wages and the other materials which would be required for the execution of the work. For these advances Fust was to have one-half of the profits made from the sale of the products of the partnership. Fust was exempted from the performance of any work or service connected with the partnership, and was not to be held responsible for any of its debts.

The books which bear the joint titles of Fust and Schoeffer are the Psalter of 1457, in large folio; the same in 1459, with some variations; the Rationale Divinorum Officiorum of Durand, 1459; the Clementine Constitutions, 1460; the Bible in the Vulgate, 1462 and 1465; a German Bible, Bulls of Pope Pius II., 1465; Liber Sextus Decretalium Bonifacii VIII., 1465; Cicero's Offices, 1465, and the same in 1466; Rhythmical Grammar, 1466. A number of other books are supposed to have emanated from their press because of the similarity of type used.

G

G THE seventh letter of the alphabet. The lower case assumes more forms than any other character, and it is more difficult to lay down rules for it. In thickness it is a trifle greater than the en quadrat. The capital letter bears a great resemblance to the character C, from which it was separated in the early ages of Rome. Diomed calls it a new consonant. A numeral G was anciently used for 400, and with a dash over it for 40,000.

G. H.—A printer's slang expression intimating that information imparted to one was previously known. An English expression, not used here.

G. I.—A printer's slang expression for general indulgence, such as celebrating a birthday or an apprentice coming out of his time. An English expression, not in use here.

Gaelic.—The language of the North of Scotland, probably prevailing in early times over the whole of that country. It bears a very close resemblance to Erse, or the original language of Ireland, and is often called by that name. It consists of eighteen letters, a, b, c, d, e, f, g, h, i, l, m, n, o, p, r, s, t, u. Of these five are vowels, a, e, i, o, u, and the remainder are consonants. Very little is printed in Gaelic.

Gag-Law.—A law passed during the presidency of John Adams which made it an offense punishable by fine and imprisonment for any one to write, print, utter or publish any false, scandalous and malicious writings respecting either House of Congress or the President. This very foolish act, as it is now believed to have been, expired by limitation in 1801.

Gage Paper-Cutter.—A paper-cutter which was formerly manufactured at Manchester, N. H.

Gages (Fr.).—Wages.

Gagner (Fr.).—To gain; to take in more words in the line, the sheet or the page; to be thinner than another face of type.

Gaillarde (Fr.).—A French body of type between eight and nine points, or between brevier and bourgeois.

Gaita (Sp.).—A printing-office joke.

Galée (Fr.).—A galley; galée à coulisse, a slice galley.

Galera (Sp.).—Galley.

Galerada (Sp.).—The matter contained in a galley; also its proof.

Galerie (Fr.).—The composing-room.

Galerin (Sp.).—A wooden galley, open on one side and at the end.

Gallarda (Sp.).—Brevier or eight point.

Gallery.—A term which is frequently used as the title to books of illustrations, being borrowed from the collections of pictures and statuary generally styled galleries.

Galley.—A shallow quadrangular box, open on the top and at one end, into which type is placed after it has been set. The original implement was of wood, with bottom, back and one end only. This is still largely used in Europe and in remote offices in America. But most of those in this country are of wood and brass, the bottom and edges being brass, while wood is used in the frame. Many are of brass alone, while there are also small galleys made of type metal, which are employed by compositors on daily papers for use in distribution. Zinc is used abroad. The usual length of a brass galley is two feet, and its usual width is from five to ten inches. A shorter galley used by make-ups and job-hands is generally of considerable width. The page is carefully made up on it, tied and then slid off on the stone. Formerly slice galleys were much used. The bottom of the galley was false, and after the page had been made up this false bottom could be drawn out, with the matter upon it, and carried to the stone, where the page was deposited by sliding. A standing-galley is one upon which matter is emptied; a savings-galley one upon which such headings and lines are put as will afterwards prove useful to the compositor; an emptying-galley a place for emptying matter as set up, and a distributing-galley a place for depositing matter which is to be distributed. See under those heads.

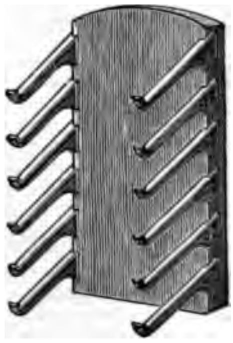
GALLEY.

Galley-Press.—A press designed to prove galleys See Proof-Press.

Galley-Rack.—A rack for galleys, generally after composition is completed. Sometimes the matter is held for a long time, and a great accumulation results. There are therefore several forms of construction.

Galley-Rest.—An attachment to a stand made for the purpose of providing a convenient resting-place for galleys, so that they may not be placed on cases that contain type.

Galley-Slaves.—An ancient term of derision applied by pressmen to compositors. Its origin is obvious, as the typesetters must continually be near their galleys. The corresponding term in German to galley is Schiff, a ship or boat.



GALLEY-RACK.

Galley-Slugs.—The compositor's slugs, by which he marks his matter.

Galley-Sticks.—Long sidesticks used on galleys for locking up. On some daily newspapers they are made of metal ; old type metal will answer very well. They do not need to be strong.

Gallows.—In a wooden hand-press the frame at and beneath the end to hold up the tympan, so that it may not fall flat, but shall be raised to an angle of twenty or thirty degrees. It has two legs and a crosspiece at the top, and bears some resemblance to a gallows.

Gallows Sockets.—Two pieces of wood with square mortises in them which receive the ends of the gallows. They are nailed or screwed upon the plank behind the tympans.—*Savage.*

Gally, Merritt, an inventor of printing-presses, was born in Western New York on August 15, 1838. His father, a Presbyterian clergyman, settled in Rochester in 1839, and died in 1844, leaving his son without an inheritance. At eleven years of age he was apprenticed to the printing business, for which he showed an aptitude. After this he published a newspaper and did job-printing and engraving, but believing a more liberal education would add to his usefulness he determined to go to college. He entered the Rochester University in 1859, was graduated in 1863, and afterwards at the Theological Seminary at Auburn, preaching for two years regularly before leaving the seminary. He was ordained as a minister by the Presbytery of Lyons, and served as a preacher and pastor for three years, when he was compelled to retire from the pulpit. The Universal printing-press was invented by him in 1869, and soon after he made great improvements in telegraphic apparatus. In 1878 he devised a method for converting in machinery variable into invariable velocity without affecting the source of power. Later he invented self-playing instruments for the automatic production of organ and piano music, which would not only render the notes but the expression ; but the greatest number of his inventions have been in printing apparatus. In all lines over five hundred patents have been granted to him.

MERRITT GALLY.

Galvaniser (Fr.).—To cover by electro-plating, as wood letter.

Galvanism.—A form of electricity which derives its name from Galvani, its Italian discoverer. It has entered quite extensively into the work of electrotyping, a process which is described in several foreign languages by some word derived from the name Galvani. The production of electricity in this case arises from the action of an acid in the cell between two plates of dissimilar metals, that which is the more oxidable giving out positive electricity. The forms in which the piles have been constructed are numerous. When quantity with a feeble tension is required a single pair of plates, such as zinc and copper, with extensive surfaces, separated by very dilute acid, will answer ; for greater power more plates are needed, or metals which excite a greater action. Many improvements have been made upon this original form. The electricity thus excited is of the same nature as that given out by the common machine, the only difference being that the method of producing galvanism is continuous. When in any way discharged it is immediately reproduced by the oxidation of the zinc. See ELECTROTYPING.

Galvanismo (Sp.).—Electrotyping.

Galvano (Fr.).—An electrotype.

Galvanoglyphy.—A method of etching upon a plate of zinc, covered with varnish. Ink or varnish is rolled over the plate, the ink adhering only to the parts which it touches, every application, when dry, raising the coating, and consequently deepening the etched lines. From this original a plate is electrotyped which can be used typographically.

Galvanography.—A process for obtaining copperplate engravings by covering a plate of silvered copper with several coats of a paint composed of any oxide, such as that of iron, burnt sienna, or graphite, ground with linseed-oil. The substance of these coats is thick or thin, according to the intensity to be given to the lights and shades. The plate is then submitted to the action of the galvanic battery, from which another plate is obtained, reproducing an intaglio copy, with all of the unevenness of the original painting. This is an actual copperplate, resembling an aquatint engraving. It may be touched up by the engraving tools. This process has been improved upon by outlines etched in the usual manner, and the tones laid on with a roulette. An electrotyped copy of this sunk plate is obtained. On this second raised plate the artist completes his picture by means of chalks and india ink, and puts in the lights and shades ; from this a second electrotyped copy is made. This second copy, the third in the order of procedure, serves, after being touched up, to print from by the copperplate press.

Galvanoplastic Process.—A method of obtaining electrotypes of fossil fishes and similar objects which can be printed on typographical presses. The method used in Austria is described as follows : By means of successive layers of gutta-percha applied to the stone inclosing the petrified fish a mold is obtained, which, being afterwards submitted to the action of a battery, is quickly covered with coatings of copper, forming a plate upon which all of the marks of the fish are reproduced in relief, and which, when printed, gives a result upon the paper identical with the object itself.

Galvanoplastik (Ger.).—Electrotyping.

Galvanotypie (Fr.).—Electrotyping.

Gambaro (Ital.).—A doublet.

Ganar (Sp.).—To gain a line by running back.

Gänsefüsschen (Ger.).—Quotation marks.

Garamoncino (Ital.).—Bourgeois. This type, which is a little larger than our bourgeois, is much more used in Italy than here.

Garamond (Fr.).—A size of type equal to ten points on Didot's system, or about equal to a small-bodied small pica.

Garamond, Claude, a French type-founder in the sixteenth century, who freed the characters of that nation from all of the Gothic features which they had previously possessed. His influence extended to all of the Latin countries and to Holland, Belgium and England. Francis I., in his anxiety to establish the University of Paris on the best possible foundation, showed special interest in the cultivation of the Greek, Hebrew and Latin languages, and in 1538 ordered the erection of a printing-office (the predecessor of the government printing-office of to-day) to be devoted to the reproduction of important works in those languages. Garamond, then very famous as a letter-founder, made for this office Roman type after the models of Jenson, and by the advice and assistance of Robert Stephens produced several exquisite fonts of Greek in imitation of the beautiful Greek manuscript of Ange Vergèce, who held the office of king's writer in Greek letters. This type was so beautiful that it rescued France from the discredit of being far surpassed in Greek typography by the publications of the Aldi. The matrixes made by Garamond were taken by Robert Stephens to Geneva in 1551, when he fled from the persecutions of the Sorbonne, and it is believed that although a royal ordinance of 1541 had ordered him a kingly remuneration for his labors in preparing this type it had never been paid, and that he considered the matrixes of Garamond his own property, the type and punches remaining in the royal printing-office. Paul Stephens, the grandson of Robert, in 1612 pledged these matrixes to the city of Geneva for a loan of fifteen hundred crowns of gold, and they were taken back to Paris in 1621 by Antoine Stephens, son of Paul, and printer to the king and clergy, to be used on an edition of the Greek fathers, they having been obtained from the Genevan government by Louis XIII. for that purpose. Garamond's type was celebrated throughout Europe. He died in 1531.

Garamone (Ital.).—Long primer, or body ten in the Italian series.

ROBERT S. GARDINER.

Gardiner, Robert S., a printer of Boston, was born in New York on March 6, 1842. He entered the printing trade in 1857 as a press-feeder and office-boy in the office of the Daily Traveler, Troy, N. Y., and after the war was employed as clerk and salesman by the railway-printing firm of Sanford, Harroun & Co., New York, that house and George Bailey, of Buffalo, being at the time the only concerns in America carrying on the business of printing railway tickets. In 1873 he joined Rand, Avery & Co., of Boston, where he remained until 1883, when by the purchase of its railroad plant by the Rand-Avery Supply Company, which company he then formed, and which he has since controlled as vice-president and manager, there was established one of the largest and most prosperous houses in the country. Mr. Gardiner was one of the original members of the Master Printers' Club of Boston.

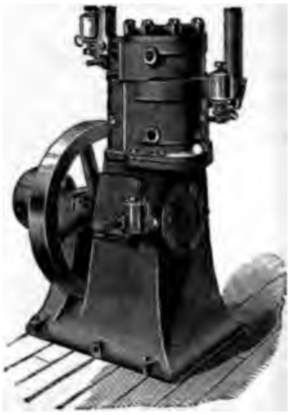
Garnir (Fr.).—To furnish; to supply.

Garniture (Fr.).—Furniture. The kinds of metal furniture most used in France are the Didot, with two side pieces held together by a transverse plate with circular apertures, and the garniture à colonnes, in which bars extend at intervals from side to side.

Garter.—A curved piece of metal, used to hold the spindle of a hand-press in position.

Gas.—Illuminating gas has been in use in London since 1807, and in New York since 1825. Westminster Bridge was illuminated by gas in 1813, and one parish in Westminster lighted its streets with it in 1814. Meters were invented the next year. Morning newspapers, first among printing-offices, employed gas, and between 1835 and 1840 they and theatres in large towns in the United States had passed permanently beyond oil-lamps and candles. In a well-lighted book and job office in this country gas will rarely be required for more than an hour in the morning and two hours in the afternoon; and if there is no regular night work it is not essential to have a gas-burner at each stand. On morning newspapers the compositor should, if possible, have a stand to himself and one gas-light, made so as to swing to either case. Where he only has half a stand each compositor should have a light, with a good shade. The emptying-galley, the copy-desk and the places for the make-up should have an abundance of lights considerably above the heads of the men. Good ventilation must be provided, as some of the gas is unconsumed, and the oxygen in the air is burned out by the flame. No very accurate tables have ever been made of the cost of gas for a printing-office; it does not vary far, however, from a cent and a half an hour per light with gas at $2.50 per 1,000 feet. On newspapers gas has lately been to some extent superseded by electric lights, the latter being both cooler and brighter. See LIGHT.

Gas-Engine.—A very compact machine, taking little space, which depends upon the explosion or sudden expansion of gas by heat to move a piston, as in the steam-engine. This explosion may take place, according to the type of machine, at every outward motion of the piston or every other motion. A certain portion of gas, mixed with atmospheric air, is forced into a hollow chamber and then ignited, either by a hot pin, a revolving jet of flame or some other way. The gas becomes very suddenly increased in volume and drives out the piston. The gas is then extruded, the piston returns on the backward stroke and the process is repeated. The present gas-engines have originated since 1876, but much experimenting was done before that date. It is claimed by the inventors of the various machines that it is far more economical with coal than even a low-pressure Cornish engine, and that there is no possibility of derangement or accident, if cleanliness is observed. It is very compact and noiseless, occupies little floor space, and requires the service of no engineer. When not needed for work the gas can be turned off, and the machine is stopped.



GAS-MACHINE.

Gasse (Ger.).—The alley between two stands at which compositors are working.

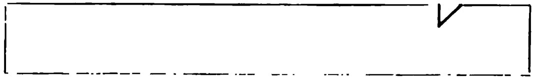
Gather Corrections.—To take letters from the case in order and carry them to the stone, there to be substituted for wrong letters in the form.

Gathering.—Gathering of books is to take one sheet from every heap, beginning with the last sheet first, viz., at the left-hand end of the range.—*Moxon.* We now reverse the heap and place the first signature where they used to place the last; they then gathered, placing each sheet upon the other; we now gather under each sheet, which is a much quicker way.—*Savage.*

Gathering is also described under BOOKBINDING. The sheets are folded, a variation from the custom of the last century. Gathering-machines are now used, in form like a revolving-table. The circumference is divided into eight, ten or more parts, and upon each of these is a pile of sheets, ready folded. Girls sit around the table, and as it revolves pick one sheet from each pile; thus in one revolution, if there are twelve girls and there are enough piles, twelve complete books are gathered. Under the old plan each girl was in the way of all of the others, when many were employed. The form of construction of this revolving-table is much like that of the carousals in the parks of our great cities. There is a circular railway beneath, of a single rail; the circumference is held up by iron rods which meet at a perpendicular part in the centre, which fits into a socket both at the floor and in the ceiling. The rim is also securely braced across the diameter.

Gathering-Table.—A table upon which the printed sheets of a book are laid, each signature by itself, and in regular relation to those by its sides. "It is usually a horseshoe table, and the boys gather on the inside, so that when they have completed one gathering they have only to turn around and commence again. When there is space enough in the warehouse it ought to be sufficiently large to hold at least fifteen sheets, with room at the end for the heap and for the knocking-up of each gathering."—*Savage.*

Gauge.—1. A piece of wood or metal used to determine the length of pages. This should be made up after the matter is set and is ready for the make-up, who is shown a book of the right length, or is told the number of lines, or whatever may be the length of page determined on. He takes a certain portion of matter, which has no notes or cuts, or anything except lines of type and leads, and brings this as near as he can to what he has been shown. The folio must be set, with the line under it, and then the matter ranged below until it fills completely to the mark. There may be a head in long primer, the line below in brevier and the body in small pica, leaded, or any other arrangement. Care must be taken in this first made-up page that there is no dirt on the leads, and that no thick or thin leads have taken the place of those of the regular size. It is pushed up compactly and firmly, a piece of reglet being laid by its side. When it is believed to be right a scratch is made across the top of the reglet to correspond to the bottom of the page. The reglet is then taken away, and with a sharp knife a cut is made in it which shows exactly where the page ends. Sometimes gauges are of type metal or of brass. 2. The length of the face of a letter, taken up and down. Thus the gauge of a B is the length of the upright line or body mark. If one letter in a font is smaller than it should be in this way it is said to be small in gauge. 3. In bookbinding, a tool used in finishing the face of which is a line forming the segment of a circle. 4. Pieces of cork glued to the tympan sheets or stuck on with melted roller composition. They are also pieces of pasteboard or card having a tongue cut out and projecting.



GAUGE.

Gauge-Pin.—A pin inserted into the tympan sheet, which can be fastened more quickly and certainly than ordinary pins or ducksbills.

GAUGE-PINS.

Gazette.—A name that is frequently applied to a newspaper.

Gazetteer.—A geographical dictionary. In some countries an officer appointed by the government to publish a certain class of news in the official organ. It was also once the term for him who prepared the intelligence or the comments for a newspaper.

Ged, William.—The name of the person who is reported to have discovered the art of stereotyping. He was a Scotchman, born in 1690, who learned the trade of a goldsmith, and practiced that art in Edinburgh with success. At that day many goldsmiths were also brokers and bankers, and Ged was no exception. He was brought into relation with the printers by furnishing them with money for their payments, and one day one of them deplored, in his presence, the difficulty of getting type or sorts in that city, there being no type-foundry nearer to them than London, and urged upon him the desirability of letter-founding. Something that he said caused Ged to consider whether it would not be possible to make a cast from a page of type, thus releasing the characters and securing the use of the page as long as it might be desired. He borrowed from one of the printers some type and began experiments. It was, however, very difficult to find any materials which were at once soft enough to make the mold, while at the same time strong enough to receive another casting. Two years were required to complete the invention. He offered a quarter interest to one of the printers in the town if he would advance sufficient money to establish a stereotype-foundry. This was accepted, and a partnership was formed lasting for two years. Long before this was completed the printer, frightened at the expense of the undertaking, desired to withdraw, and did so when the time had expired, but without supplying all of the money he had agreed upon. A stationer from London, named William Fenner, who was in Edinburgh on a visit, offered to establish a foundry in London for half the profits, which was agreed to. To accept this offer it was necessary for Ged to dispose of his business as a jeweler. He then went to London, but the enterprise proved unsuccessful. Fenner introduced him to Thomas James, the type-founder, and a company was shortly afterwards formed consisting of Ged, Fenner, Thomas James, John James, his brother, and James Ged, the son of the inventor. Thomas James was applied to for type, with which to make experiments, but he supplied that which was old and worthless. Ged then applied to Caslon, who denied the utility of the invention, and asserted that he could, if he chose, make as good plates as Ged. A trial followed in which the Scotchman was successful, and as a result he obtained permission from the University of Cambridge in 1731 to print Bibles and prayer-books by this plan.

This new position was not, however, more successful than the others, for James, the type-founder, was unwilling to see success follow Ged's efforts. He completed two prayer-books, in spite of errors purposely made by the compositors in typesetting and batters on the form by the pressmen. After five years of struggle he gave up the contest. The books, so far as they were done, were suppressed by authority, and the plates were melted up. He returned to Edinburgh and received from his friends sufficient to pay for the stereotyping of a single volume, and having apprenticed his son to a printer he was at length enabled, with the young man's assistance after hours, to produce a copy of Sallust. This was in 1736, after he had been occupied for about eleven years in the attempt. This public proof of his success was not a fine specimen of work, but was well enough done to show that there was really a valuable art behind it. Another book was brought out in 1742. Ged died in 1749. The method used by him was the plaster process, and some knowledge of it was probably obtained by Tilloch, who fifty years afterwards was engaged in attempts at stereotyping.

Gedankenstrich (Ger.).—A hyphen.

Geddes, William F., a printer of Philadelphia, was born near Linden, Franklin County, Pa., in 1798. He was apprenticed to the Harrisburg Journal in his sixteenth year, and in 1825 began publishing in Philadelphia, and continued in that occupation until he retired from active life in 1867. He was during this period the printer of Hazard's Miscellany. At his death, on January 29, 1888, he was the oldest printer in Philadelphia, being then in his ninety-first year.

Gelatine.—A transparent substance obtained by boiling with water the soft and the solid parts of animals, as the muscles, the skin, the cartilages, bones, tendons, ligaments and membranes, forming in solution when cool a tremulous mass of jelly. Isinglass, glue and size are various forms of gelatine. Its chief use in the printing-office is under the form of GLUE, which see. In practice the distinction which is made between glue and gelatine is that the latter is more refined. It forms the greater portion of the substance used in copying letters, known as the hektograph. A letter is written in a peculiar ink, the page afterwards being laid down on the pad of gelatine, which takes off all of the surplus ink. The gelatine keeps it on the surface, but does not allow it to spread; and if a fresh sheet of paper is laid upon it a portion of the ink is taken up. Thirty, forty or even fifty copies can be taken in this way. Paper when made up in pads is often glued together at one or two sides. If this is done with gelatine there is a certain degree of elasticity about the pads when new which is lost as they become old. Gelatine is the foundation of many process methods of engraving, depending for this upon its quality of becoming hardened by light. That which is untouched by light is easily washed away by water, an acid or an alkali. From this a cast can be taken or an electrotype, or it can be used to print from without any further manipulation. More than a dozen processes are known, each differing widely from each other. See under Process Printing.

Gelatining.—Show-cards in gold and colors are often improved by being gelatined. Procure several tablets of flatted ground glass, cased in wooden frames. A rack should be set up to contain these tablets, which should each have a distinctive number and an allotted place in the rack. The manipulation of the process should be in a room where little or no dust is raised. The framed rack should be built with three-inch strips of wood, like a drying-rack for gumming envelopes, the back part fastened to a smooth wall and the under part or bottom covered with pasteboard. The several compartments in the rack must be made exactly level, and it is best to have this done with a spirit level, so that the requisite horizontal position of the glass tablets should be exact without having recourse to packing up. If this is not done the covering of the fluid material will not be altogether equal. The gelatine itself, which is a white glue obtained from bones, as well as the offal of tanners, is obtained in weak, nearly opaque cakes. The Chinese gelatine, which is obtained in the form of folded tubes, and is of a very fine white light substance, of vegetable origin, can only be dissolved in boiling water. Ordinary gelatine is thus treated. It is first broken into small pieces, then put into a clean linen cloth and suspended (still in the cloth) in a basin of water, which is placed in an open crucible and then submitted to the heat of a spirit lamp, by which the gelatine is dissolved by the boiling water and the impure parts remain in the cloth. The quantity of water and gelatine should give a light, easy fluid, to which an equal part of spirits of wine is then added, as without this addition the fluid poured on the glass tablet would soon get cold and spread unequally, while by means of the spirits of wine it levels equally and easily. The most suitable mixture for this is gelatine, two parts; water, five parts; spirits of wine, three parts. But the vessel containing this, after the addition of the spirits of wine, should be covered up, in order that it may not evaporate. It is also necessary that a glass vessel, provided with a measuring scale, such as chemists have, should be used, so that the operator may be enabled to judge how much of this fluid gelatine is necessary for a tablet in order not to get too weak or too strong a cover. Before the pouring out the glass tablet should have a slight coating of oil upon the surface, to keep the gelatine from sticking to the tablet. The subsequent manipulation is conducted as follows: After the requisite quantity of gelatine has been emptied into the graduated glass it is poured, in a semi-warm state, on the slightly oiled glass tablet, where it assumes a syrup-like consistency, and then the tablet is moved gently to and fro, until all parts of it are covered by the fluid. The tablet is then put in its place on the rack, and in a similar manner all of the other tablets are regularly treated. After a quarter of an hour, when all of the fluid mass on the glass tablet begins to get consistent, the picture or ticket which is to be gelatined should be moistened with water on its back, with a sponge, and put
on the gelatine. Any air bubbles which may arise
ering should be pressed out with the hand towa
edges, and care should be taken that the edges of
ture adhere well. In this state the sheets should
for two or three days, lying on the rack until t
completely dry, when with a blunted or dull kn
surplus gelatine at the edges is cut away, and th
which now adheres to the gelatine, is taken off t
tablet. It should be understood that the frame an
of the used tablets must be carefully cleaned fr
adhering gelatine before they are used again.–
ward.

Gem.—A size of type made in England, next
than diamond, and next larger than brilliant. I
be about half of a small-bodied bourgeois, or fou
quarter points.

Genealogical Works.—These differ muc
other books in their excessive use of abbreviati
peculiar indentations and their employment of c
small capitals and Italics. There are many unc
words, and in this country there is large use of s
figures. The first member of a family who settle
colonies is given the figure ^{1}, the next ^{2}, the thir
so on. Few families have gone beyond seven o
and none beyond ten. Thus in a certain family
cessive members would be known as John^{1}, G
John^{3}, Henry^{4}, Thomas^{5}, Joseph^{6}, John^{7} and Robe
this plan John^{1}, who came over from England
Mayflower or soon after, is distinguished from his
son John^{3}, and both of them from their descendan
Otherwise it is very probable that writers may co
them. Two eminent lawyers of New York, fat
son, whose names were William Smith, have oft
confounded by writers. Both were lawyers and b
the same offices. It is difficult now to distinguis
except by saying Smith the historian and Smith th
grant. But by the numbering plan William Smi
William Smith^{2} are very easily identified. In a larg
where thousands of names are found this is almo
cessity. Another help is to distinguish them by n
attached. Thus the first William Smith (973) and
ond William Smith (1742) are identified by these
although there may be a hundred other William
in the book. Somewhere is the definition as to
Smith is meant. Both of these marks can be u
gether, if desired. Many abbreviations are used i
alogies, such as æt. for aged; ob., died; m., marrie
wife; fil., son; and d., died or daughter. Much
found among records of two hundred years ago,
terms of heraldry, also used, are French. It is a
copying old records that they shall be followed
actly as type will permit, not correcting misspelli
grammar, punctuation or other errors. If moder
all they should be completely modernized. Pedig
set as shown under Pedigree.

General Bill.—A bill of the amount of wor
in a companionship in England upon a certain bo
differs from an individual bill, as it sums up the
several men.

Gensfleisch.—The family name of John Gut
the inventor of the art of printing. His paren
Frielo Gensfleisch and Else Gutenberg. They h
children, John, the inventor, and Frielo. Thi
Frielo was always known as Gensfleisch, but his b
while generally known as Gutenberg, was occas
called John Gensfleisch, Jr. A legal document of
of Strasbourg names him John, called Gensfleisc
Gutenberg, of Mentz. The name of Gensfleisch
always to have been prominent in the civil distu
of Mentz. The great-great-grandfather of Gut
took side with one of the rival archbishops, and
aided him in burning some convents, for which he
under ban by the Emperor Louis. In the same
and other noblemen made themselves so offensiv
burghers that they were obliged to flee for thei

The name of the brother of Frielo Gensfleisch, Sr., was John Gensfleisch, Sr. He is the man improperly described by Meerman as the elder brother of John Gutenberg. The identity of his baptismal name with that of the inventor of printing has been the occasion of many mistakes. The uncle has been confounded with the nephew. The family was wealthy. It had, in or near Mentz, three houses or estates, known as Zum Gudenberg, Zum Jungen and Zum Gensfleisch. The members of the family were sometimes called Sulgeloch or Sorgenloch, from a property on which they resided outside of Mentz.

Gent, Thomas.—A printer in the city of York, England, who lived to be eighty-seven years old, and who, during the course of his long life, had published a great number of small books. He was born in Dublin and served his time there, afterwards working in London; in 1724 he removed his printing-office from London to York, and there remained. He died in 1778.

Gentlemen's Card.—In England a size of card 3 by 1½ inches. Also called thirds (a third of a large card).

Geometrical Signs.—Special characters relating to geometry. See SIGNS.

Georgia.—Printing began in Georgia in the year 1763, with the Gazette at Savannah. James Johnston was the printer. This was the only place where the erection of a press was attempted before the Revolution, and like many of its contemporaries the Gazette was compelled temporarily to suspend when the stamp act was passed. The total number of newspapers and periodicals published in 1820 was 13; in 1840, 34; 1850, 51; 1860, 105; 1870, 110; 1880, 200; and 1890, 257. The chief towns in printing are Savannah, Augusta and Atlanta, considerable job-printing being done in Savannah and Atlanta.

Gérant (Fr.).—The responsible person in a newspaper; the one upon whom the law calls in case of an infraction of the press laws or in case of libel.

German.—The proposed name of a size of type of a body equaling one and a half points. It is needless to say that this size has never been made, although letters as small have been produced by process work.

German Language.—The earliest authentic mention of the Germans is found in Cæsar. They then inhabited the same country which they now do. Their language, however, to judge of it by existing remains, was more artificial than at present, modifications of ideas being expressed more by inflections of the words than at the present time. The language belongs to the Germanic group, of which the English, the Dutch, the Danish and the German are the chief subdivisions, but which also includes Swedish, Icelandic, Frisic and Belgian. The various tongues of this group are now spoken by nearly two hundred millions of people, while the Romance languages, which include French, Italian, Spanish, Portuguese and some lesser, are only used by one hundred and twenty millions. Together these two groups of languages embrace all that is worth learning or knowing upon the face of the globe, with the exception of the other languages themselves, the poems and light literature contained in them and the particular geography and history of the countries where they are spoken. The earliest example of a Germanic tongue is that contained in the Mœso-Gothic of Ulphilas, who translated the Bible into that speech between 360 and 379. This is not the ancestor of the German language, but was closely related to its progenitor. There are remnants of Anglo-Saxon, another of the Teutonic languages, in the fifth century, and of Old High German in the seventh century. By 800 a little had been written in German, and by 900 there was a perceptible gain; but the habit of writing in Latin everything fit for preservation caused neglect of German, and except poems and songs there was a paucity of literature in it until the fourteenth and fifteenth centuries. Luther's translation of the Bible set the standards of the language in 1534. Before that whatever was written was in one of the dialects in which German is so rich, one predominating after another; the translation fixed the written language in the present New High German. The printing-press gradually found its readers among those who did not understand Latin, and German began to be cultivated everywhere, although colleges still gave instruction in the ancient tongue of Rome, a practice which has continued down nearly to the present time. There are, indeed, professors now living who prefer to teach and to write in the language of Cicero and Cæsar. It was not until the middle of the last century that great writers in the drama, poetry and criticism appeared. Lessing, Klopstock, Wieland, Schiller and Goethe are among the great names which appeared then or soon after. They left the literature with an independent stamp upon it, uninfluenced by French, which had previously been much cultivated, and in forms of the greatest beauty. For one hundred and fifty years the German press has been extremely productive, and at the present day he who wishes to examine with thoroughness any department of pure knowledge must be familiar with German. Printing is inexpensive, and the publication of a work of research adds much to the reputation of an author and indirectly to his income, as very many are employed as professors in universities, where they depend upon fees from the scholars, and others have government posts. The cost of living is low, the German man of letters not expecting to receive the pecuniary returns which an American or Englishman would think were his due if successful, and he has intelligent criticism and co-operation. Examples of this research may be given in philology, Biblical criticism, classical antiquities, geography, ancient and modern history, &c. The system of education there, demanding considerable classical and mathematical knowledge at the gymnasiums, and then permitting choice of specialties at the universities, has much to do with the number of learned men.

German, in comparison with English and French, is a highly inflected language. It has four cases and three genders, the latter not following nature generally, and adjectives and pronouns are also inflected. The verb and preposition are much like English, the older and most needed verbs being irregular, as they are with us. Transposition of words is more easy in German than in English, and still more so than in French. The chief difficulty with a student is in remembering the genders and the cases. The most necessary words have commonly the same origin as in English, as Brod, bread; Haus, house; Mond, moon; Wasser, water; Milch, milk. They are compounded or welded together freely, as we do in railroad, which in German is Eisenbahn, iron road. There is none of that sharpness and clearness of usage in German respecting the use of words regularly formed which prevails with us. We cannot say unmovable for immovable; nor can we say unforgetfulness, disremember, superiorly. Usage of the best writers has sanctioned one or two forms of expression and practically forbidden the rest, as it has also in French; but in German any regular form can be used, sanctioned or unsanctioned by usage, if correctly derived from German words and their suffixes or prefixes.

The Lord's Prayer in German and Mœso-Gothic is herewith given, the former being taken from Luther's translation of the New Testament in 1522, with modernized spelling.

MŒSO-GOTHIC.—Attar unsar thu in himinam, veihnai namo thein. Qimai thiudinassus theins. Vairthai vilja theins sve in himina jah ana airthai. Hlaif unsarana thana sintein an gif uns himma daga. Jah aflet uns thatei skulans sijaima svasve jah veis afletam thaim skulam unsaraim. Jah ni briggais uns in fraistubnjai. Ak lausei uns af thamma ubilin. Unte theina is thiudangardi jah mahts jah vulthus in aivins. Amen.

GERMAN.—Unser Vater in dem Himmel, dein Name werde geheiliget; dein Reich komme; dein Wille geschehe auf Erden wie im Himmel. Unser täglich Brot gib uns heute, und vergib uns unsere Schulden, wie wir unsern Schuldigern vergeben; und führe uns nicht in Versuchung, sondern erlöse uns von dem Uebel. Denn dein ist das Reich und die Kraft und die Herrlichkeit in Ewigkeit. Amen.

The study of German is not very difficult. Nine-tenths of all of our common words are to be found in that language, although disguised; its accent resembles ours, and although there are some difficult sounds they are acquired after a little, and can then always be distinguished by the ear. The spelling of German is regular and is unattended with such curious combinations as are found in English and French. The language of common people is quickly learned; but that of science, literature and history has many words which cannot be understood even by knowing the elements. Thus while St. Mark can be understood in most places after a few weeks of study, the same time devoted to the Epistle to the Hebrews would produce very little results. Acquisition of German is best made in books on Ollendorff's plan, then followed by grammars on the old method, continually supplemented by outside reading and by conversation with Germans. A good plan is to learn extracts from good authors by heart. The most common small English and German dictionary found here is Oehlenschläger's; larger dictionaries are Adler's and Grieb's. A valuable large German work is Grimm's Wörterbuch, and there are many others.

The orthography of German has altered considerably since the invention of printing. One difficulty which the language has always had is in distinguishing the lighter from the heavier labials, an uncertainty which still prevails in speech, although the spelling has been fixed by usage. Thus the final consonant in und, and, is pronounced as a t; bleiben, to stay or to remain, might be pronounced bleipen anywhere in Germany without exciting remark; and it is well known how difficult it is for the German in America to say take instead of dake. Where there was doubt, usage has sanctioned one form. For instance, in a book published in 1572 Truckerei is used, instead of Druckerei. The latest change before the middle of this century was that of y to i in such words as seyn, but of late the silent h has been dropped by many printers in words like Theil. This usage is not uniform.

German, Printing in.—The chief fact which strikes those who attempt to read a German book or to study German typography is that the characters are in black-letter, or in that style which was used by copyists in Germany before the invention of printing. These have been slightly modified, but at no time has the popular taste inclined towards the shape of the letters used in England, Holland, France and the countries in the South of Europe. The German character is called at home Fraktur, or broken; and the Roman letters are known as Antiqua, or old. In speaking of the alphabets the latter is called the Latin, and the characters Latin letters. The German alphabet has the same number of letters as English, excepting that in the Fraktur I and J have the same letter as a capital. When type is set in Roman a distinction between the two is made. The letters are as follows:

𝔄	𝔅	ℭ	𝔇	𝔈	𝔉	𝔊	ℌ	ℑ	𝔎	𝔏	𝔐	𝔑	𝔒
A	B	C	D	E	F	G	H	I or J	K	L	M	N	O

𝔓	𝔔	ℜ	𝔖	𝔗	𝔘	𝔙	𝔚	𝔛	𝔜	ℨ	𝔄̈	𝔒̈	𝔘̈.
P	Q	R	S	T	U	V	W	X	Y	Z	AE	OE	UE.

𝔞	𝔟	𝔠	𝔡	𝔢	𝔣	𝔤	𝔥	𝔦	𝔧	𝔨	𝔩	𝔪	𝔫	𝔬	𝔭	𝔮
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q

𝔯	𝔰	ſ	𝔱	𝔲	𝔳	𝔴	𝔵	𝔶	𝔷	𝔱𝔷	𝔣𝔣	𝔣𝔦	𝔣𝔩	𝔠𝔥	𝔠𝔨	𝔩𝔩
r	s	s	t	u	v	w	x	y	z	tz	ff	fi	fl	ch	ck	ll

ß	ſſ	ſi	ſt	𝔞̈	𝔬̈	𝔲̈.
ss	ss	si	st	ae	oe	ue.

Of these the capitals which differ most from the English are 𝔎 and 𝔙 (K and V), and in the lower case those which are most unlike are 𝔨, ſ, 𝔵 and 𝔶 (k, long s, x and y). The strange and ambiguous letters are here grouped together:

𝔅 (B) and 𝔙 (V).—The latter is open in the middle, the former joined across.

ℭ (C) and 𝔈 (E).—𝔈 (E) has a little stroke in the middle projecting to the right, which ℭ (C) has not.

𝔊 (G) and 𝔖 (S).—𝔖 (S) has an opening at the side, while 𝔊 (G) is closed, and has besides a perpendicular stroke within.

𝔎 (K), 𝔑 (N) and ℜ (R).—𝔎 (K) is rounded at the top, 𝔑 (N) is open in the middle, and ℜ (R) is joined in the middle.

𝔐 (M) and 𝔚 (W).—𝔐 (M) is open at the bottom, but 𝔚 (W) is closed.

ℑ stands for both I and J. Against a vowel it is J; against a consonant it has the power of I.

The 𝔦 (i) and 𝔧 (j) are distinguished from each other by the latter falling below the line.

Lower-case 𝔟 (b) and 𝔥 (h).—The 𝔟 (b) is perfectly closed below; 𝔥 (h) is somewhat open and ends at the bottom, on one side, with a hair stroke.

Lower-case 𝔣 (f) and ſ (s).—The 𝔣 (f) has a horizontal line through it, while ſ (s) has one on the left side only.

Lower-case 𝔪 (m) and 𝔴 (w).—The 𝔪 (m) is entirely open at the bottom, but the 𝔴 (w) is partly closed.

Lower-case 𝔯 (r) and 𝔵 (x).—The 𝔵 (x) has a little hair stroke below, on the left.

Lower-case 𝔳 (v) and 𝔶 (y).—The 𝔳 (v) is closed at the bottom; 𝔶 (y) is somewhat open below, and ends with a hair stroke.

The other letters can be distinguished from the comparisons given above; 𝔣𝔣 (ff) from ſſ (ss), ſi (si) from 𝔣𝔦 (fi) and ß (ss) from 𝔱𝔷 (tz). The other double letters are 𝔠𝔨 (ck), 𝔠𝔥 (ch), ſl (fl) and ſt (st). There is a double 𝔩𝔩 (ll).

A font in Fraktur characters has no small capitals and no Italic. Emphasis is given by putting thin spaces between the letters of important words, or in works where great delicacy does not need to be observed by using heavier type. The lower-case e is most used of all characters; next follow n, r, i, d, a, t and u. The proportions are 54, 34, 24, 22, 16, 15, 15 and 14. Together these letters embrace two-thirds of the single lower-case letters, and e has about 19 per cent. The letter least used is x. The punctuation and subsidiary marks are known as the Punkt (period), Komma (comma), Kolon (colon), Semikolon (semicolon), Ausrufzeichen (exclamation mark), Fragezeichen (interrogation mark), Divis (hyphen), Paragraph (section mark), Parenthese (parenthesis), Klammern (brackets), Sternchen (asterisk), Kreuzchen (dagger), Strich (dash) and Apostroph (apostrophe). There are many commercial abbreviations.

The German script characters are very unlike the black-letter or the forms of writing used in England, France and America. The peculiarities are shown in the characters on the page following.

The case in use in Germany is generally large and wide, having both lower case and capitals in one. There are two crossbars, running from the top down, the most used letters being between these bars, those beyond them being less frequently employed. The bars are not so high nor yet so strong as those used in America. These two bars are divided unequally at right angles by another bar, which runs from one side to the other of the case. Above are four rows of boxes, and below six. In the other direction there are ten full-sized boxes, some being, however, divided into two and some being doubled. Beginning at the top left-hand corner of the case, the capitals are taken, running in the first row from A to K; in the second from L to U, and having four additional boxes at the right-hand side of the third row. The figures are at the left. The next row is of little used letters. Below these are the lower-case letters, a, e, d, m, i, n, o, t, u and r having double-size boxes. The space box with us is by them appropriated to en quadrats, and a part is taken from the i box, immediately beyond it, for five-em spaces. The position of the smaller boxes bears no relation to their situation in English offices, but there is a rude alphabetical arrangement in the large lower-case letters. When Roman is set the small capitals have the farthest row, the capitals next, the third has the figures and the remainder of the capitals, and the fourth row is accents. The lower case is arranged nearly as the Fraktur case is. The case is more crowded, as there are more characters.

In this country, where more German is set than anywhere else away from the centre of Europe, the cases are double, as English cases are, and are laid somewhat in the same way. The lay shown on page 230 is that adopted by the New-Yorker Staats-Zeitung.

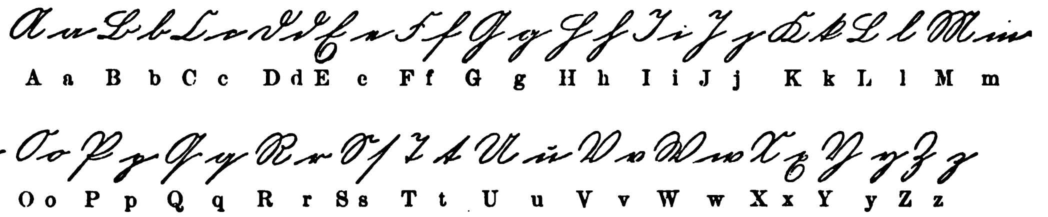
A peculiarity in the left-hand corner will strike every American and English printer. It is two large boxes left vacant to be used for extra e's, quadrats or for any other sorts which should prove redundant in distribution, or which might be needed in composition when the ordinary boxes were not large enough.

German types do not conform to a general standard. Two or three makers have a different system of points, varying from each other and from English and American standards. The names, with a somewhat approximate American equivalent, are as follows:

Names.	Size in French Points.	American Name.
Diamant	4	Diamond.
Perl	5	Pearl.
Nonpareille	6	Nonpareil.
Colonel	7	Minion.
Petit	8	Brevier.
Bourgeoise (Borgis)	8½	Bourgeois.
Corpus (Garmond)	9	Long Primer.
Discendian	10	Small Pica.
Cicero	11	Pica.
Mittel	12	English.
Tertia	14	Great Primer.
Text	16	Paragon.
Doppelcicero	24	Four-line Minionette.
Doppelmittel	28	Double Great Primer.
Kleine Kanon	32	Double Paragon.
Grobe Kanon	40	Four-line Small Pica.
Kleine Sabon	64	Six-line Pica.
Grobe Sabon	68	Five-line Great Primer.
Kleine Missal	80	Seven-line Pica.
Grobe Missal	96	Nine-line Pica.

The basis of calculations is Cicero. The height to paper is rather greater than that of American types, but varies much.

One great drawback which is found in every German office is the necessity of keeping up fonts of both black-letter and Roman. The former is much the most used, particularly in commercial work in German towns, but as many languages are there printed, and as scientific books are chiefly done in Roman, while much other matter, for the sake of appearance, is also in Roman, the printer must have very much unused type. Both old-style Roman and modern Roman are employed. The cut of the latter is somewhat different from English faces, as other patterns are followed. The types most used for the body of a work are Bourgeoise and Corpus, but sometimes Cicero. Quotations and notes are in Petit or Nonpareille. Matter is rarely so profusely leaded as in France, nor are margins so wide.

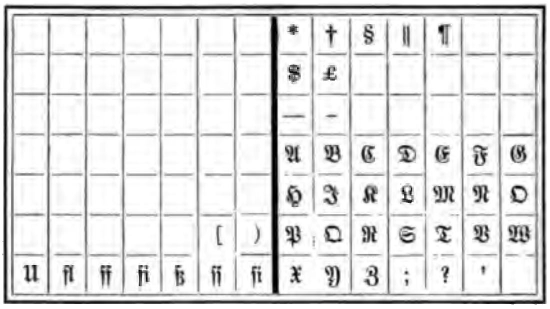

A a B b C c D d E e F f G g H h I i J j K k L l M m
N n O o P p Q q R r S s T t U u V v W w X x Y y Z z

GERMAN SCRIPT ALPHABET.

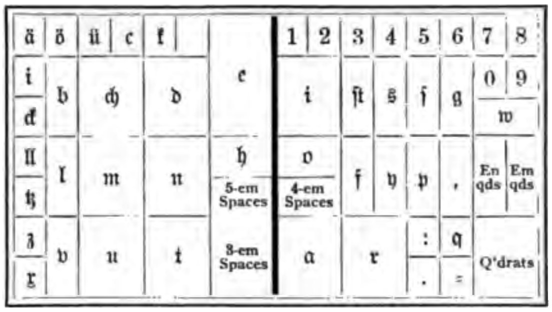
Capitalizing in German is done differently from that in English. Every noun takes a capital, and not alone proper nouns or those words which are constructively so. When an adjective is preceded by a word which shows it to be taken in a substantive sense it requires a capital, as nichts Neues, nothing new. The words which demand this in a succeeding word are etwas, viel, wenig, nichts, allerlei, genug and ähnlichen. Adjectives derived from places or countries are written small, as frankfurtisch, englisch, preussisch, Frankfort, English, Prussian. Adjectives which form a part of a compound proper name take capitals, as das Schwarze Meer, the Black Sea. The names of persons used as adjectives take capitals, as Grimmsche Märchen, Grimm's stories; Didotsches System, Didot's system; but where they are taken in a general sense, not relating to the person from whom the name is borrowed, small letters are used, as lutherische Konfession, Lutheran confession. The first personal pronoun is written with a small letter, as ich (I), but the person addressed is Sie (you). When the extreme of old-fashioned politeness and formality is used, as in Euer (you), that is also capitalized. Words in apposition, being a proper name, although one is an adjective, are capitalized, as Friedrich der Zweite, Frederick the Second.

Words are divided on the pronunciation and not on the etymology. Thus lie- | ben, not lieb- | en; En- | dung, not End- | ung. When, however, words have become joined together, either with or without prefixes or suffixes, they are divided according to their originals, when no violence is done to the pronunciation, as war- | um, vor- | aus, her- | ein, beob- | achten, Inter- | esse, Mikro- | skop. When a consonant comes between two vowels it belongs to the second one, unless it violates the rule concerning joining of words just given, as tre- | ten, le- | sen, nä- | hen. Double letters which are consonantal, as ch, sch, dt, ph and th, cannot be divided, and both parts must go in the second line, as Bräu- | che, Orthogra- | phie, Stä- | dte, Verwan- | dte. One rule as laid down is directly contrary to that which formerly existed in English. In our tongue where the small s ended a syllable the long ſ began one, but, for the sake of marking the sharp pronunciation, words in German which contain a double s in such a way that one ends one syllable and a second one begins another are divided hei- | ssen, hei:ſſen, Fü- | sse, Fü:ſſe. It is in Roman characters that the two s's are used; in Fraktur the common double s, ß, is employed. When two or more consonants come together, unaffected by the previous rules, the last syllable takes the last letter, and the other is joined to the first syllable, as här- | ten, Ach- | sel, Fin- | ger. The double consonants st and sp are indivisible; they belong to the second line, as La-sten. The same rule applies to pf when following r or m, as kämpfen, Kar-pfen.

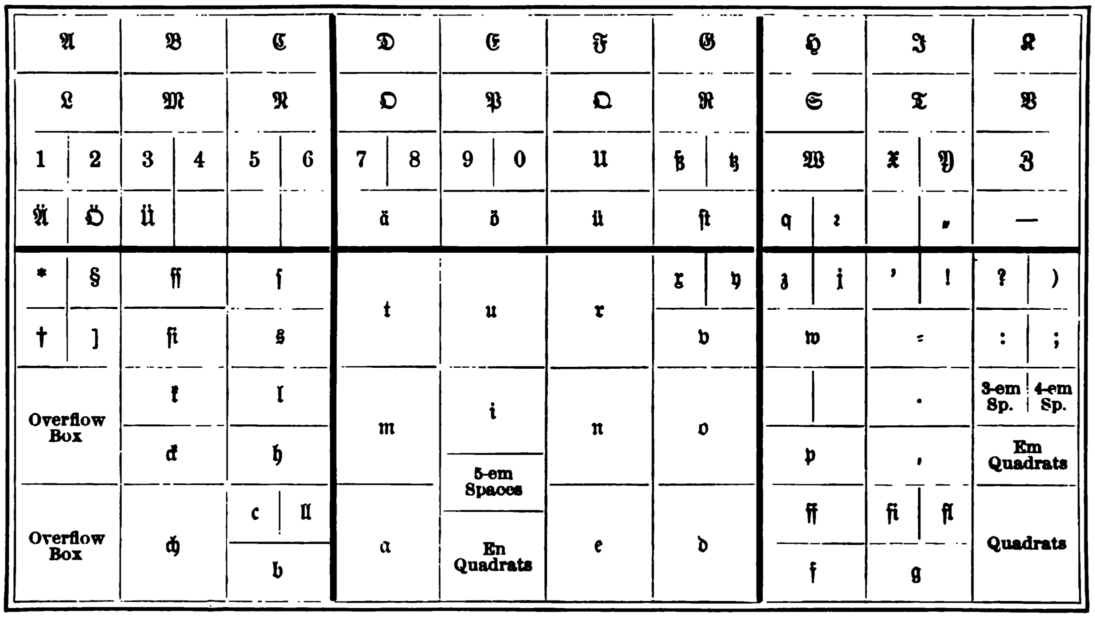
Hyphens are used for connecting words temporarily used together, as they are in English. Words are, however, consolidated more freely than in English, making to all appearance one word. Many years ago there was a very popular book in English entitled Thinks-I-to-Myself. Most printers in America would put spaces where hyphens are here used, but in German it would not be thought singular, and such words can undergo grammatical changes and be put into relationships which would not be tolerated in English, as: "The Thinks-I-to-Myselfs are nearly exhausted. We must reprint." Another usage in German is to take two or more words connected in sense with another, and the last one consolidated with it or hyphenized with it, and to place a hyphen after those words which are remote from the last one, as Feld- und Gartenfruchte, field and garden fruit; Vokallänge und -kurze, long and short vowels (literally, vowellong and short). Sometimes a hyphen is used to separate one word from another in meaning, as to distinguish Erd-rücken from Erdrücken.



AMERICAN LAY OF THE GERMAN UPPER CASE.



AMERICAN LAY OF THE GERMAN LOWER CASE.



A B C D E F G H I K
L M N O P Q R S T V
1 2 3 4 5 6 7 8 9 0 U ß tz W X Y Z
Ä Ö Ü ä ö ü ſt q z , —
* § ſſ ſ t u r z y j i ' ! ?)
†] ſi ß v w - : ;
Overflow Box
k l m i n o . 3-em Sp. 4-em Sp.
ck h p , Em Quadrats
5-em Spaces
Overflow Box
ch c ll a En Quadrats e d ff fi fl Quadrats
b f g

LAY OF THE GERMAN CASE. AFTER BACHMANN.

Apostrophes are used in printing to indicate an omission of sound where a vowel comes. The grammar of German is elaborate, but common people pronounce words very differently from the printed form and from the method given in the pronouncing dictionaries. In certain words this variation exists even among the highly educated class. In verse no poet hesitates to use a redundant syllable where that syllable is not pronounced in common usage. There consequently exists a habit of denoting the omission by an apostrophe, as is done sometimes by us in the word thro'. Examples are: Ich lieb' ihn, das leid' ich nicht; heil'ge. Certain words are always joined in pronunciation which follow this rule, as ist's (is it), geht's (does it go). Where a preposition is consolidated with one of the articles the apostrophe is not used, as am, beim, zum, unterm. When proper names are in the genitive, but end with letters which easily take an s after them, the apostrophe is omitted, as Ciceros Briefe, Schillers Gedichte (Cicero's Letters, Schiller's Poems); but where it is difficult to add an s the apostrophe is put there, as Demosthenes' Reden (Demosthenes's Speeches).

The German accents, ä, ö and ü, indicate the omission of the letter e. It was formerly denoted by a small e over the top of the other letter, and was shown also by two perpendicular marks. The compositor must not imagine because he sometimes sees these marks over the top of a word and sometimes does not see them that the one or the other is wrong. They may both be right, in different places. It is also permissible in jobs, inscriptions, capital lines and other places where there is plenty of room to spell out these compound letters. Some proper names, as Goethe, are always written in full, yet in his lifetime his name was frequently printed as Göthe.

A general practice is to use letters and figures of the ordinary size, in Italic, for references to notes, accompanied by one parenthesis, as *a*). Roman is also used in the same way.

Folio headings of books printed in Fraktur are usually in type like the text; headings to sections, or subdivisions of headings, in type slightly larger and blacker than the text.

Quotations of words or sentences are indicated by two sharp-pointed commas before the bottom of the letter where the quotation begins, and the same upside down where it ends, as „Ausſchießen.“ The same usage is observed in Roman characters, as „Die Kunst zu sterben.“ Apostrophes are not used for this purpose.

The German marks of correction are much like those in English. Bad and wrong letters are indicated by writing the right letter in the margin. Paragraphs are shown by a bracket marked in. The dele or take-out mark is the same as in English, but resembling the German form of d more than ours. A doublet is known as a Hochzeit, or wedding. The space mark in English (#) is employed in German to indicate a high space, a lead being up, or a rectification of spacing. As there is no Italic, and emphasis is indicated by thin spacing emphatic words, a special mark is contrived for this, which is a straight line with a number of inclined strokes crossing it. To show that durchschossene Wörter, as these are described, should be altered back, a wave line is used in the margin. A word which cannot be deciphered, or for which there are no sorts, is shown, as in English, with the feet at the top and the heads down. Crooked lines have parallel straight lines drawn against them, above and below. Run-in paragraphs are marked by a line drawn from the end of one paragraph to the beginning of the next.

The sizes of German papers are as follows, for writing-paper (Schreibpapier):

Names.	Size, in Inches.	Names.	Size, in Inches.
Schlängle	12.2 × 15.3	Canzlei untrimmed.	13.10 × 16.9
Canzlei or Reichsformat	12.9 × 16.5	Pro patria	14.1 × 17.3
		Löwen	14.3 × 19.2

Those for account-books and drawing-papers, the former being glazed and the latter not, are:

Names.	Size, in Inches.	Names.	Size, in Inches.
Klein Median . . .	15.6 × 20.0	Gross Royal . . .	20.7 × 27.1
Median	16.5 × 21.5	Super Royal . . .	21.5 × 28.2
Gross Median . . .	17.3 × 23.2	Imperial	22.8 × 29.8
Klein Royal . . .	19.2 × 24.8	Klein Adler	24.4 × 35.5
Noten Royal (for music)	19.9 × 26.3	Elephant	26.3 × 36.3

There are no fixed sizes of printing-papers, the sheets always being cut to order, each publisher choosing his own size.

Capitals of Fraktur are not used together in titles and headings, but these headings are put in lower case capitalized.

The use of heavier rules than is customary in America is permitted in tabular matter, and instead of using dashes or short brass rules across the page and long rules going up and down without being broken, the brass rules cross the page, and the up and down rules are broken.

German Printing in America.—The German press in the United States is more powerful than in any other country besides the three in which the language is indigenous. Printing was done in America in that tongue shortly after the emigration from the Palatinate of the Rhine during the reign of Queen Anne, in 1710. Christopher Sauer printed a newspaper at Germantown in 1739, and Joseph Crellius one in 1743. Many large and important works were issued at Ephrata, in Pennsylvania, before the Revolution. In 1810 there were eight German newspapers in that State. Shortly after this the number began to increase, and there were also printers who did job-work in German, but had no newspaper. The earliest printer in New York who did much in this way was Ludwig, who was born of American parents, and learned the language after reaching maturity. The New-Yorker Staats-Zeitung was established in 1834, and is now probably larger and more profitable than any German newspaper published in the Old World. In 1850 there were 133 German newspapers in the Union, and in 1880 641 periodicals of all kinds. In 1890 there were 797 published in the United States and Canada; New York had 110, Ohio 104, Pennsylvania 90, Wisconson 87, Illinois 74, and Missouri 45. Ninety-one were daily. The largest book hitherto published in America in the German language is an encyclopædia, edited by Dr. Alexander J. Schem. It is the German Conversations-Lexikon, with copious American additions originally.

Germany.—The general opinion of all nations is that Germany was the birthplace of printing. The claims of only two places besides Mentz have ever been entertained in this connection by any large number of persons. They are Haarlem, in Holland, and Strasbourg, in one of the provinces lately taken by Germany from France. It seems incontestable, however, at this period of time, that whatever may have been done at Haarlem the work led to nothing. It was not printing from movable types, cast in a mold, and it is doubtful whether any typographical remains of a period antecedent to the beginning of an office at Mentz are extant. As related elsewhere, Gutenberg began his attempts at printing in Strasbourg, removing to Mentz about the year 1444. From the time when the forty-two line Bible was published it is apparent that work on it must have begun as early as 1450. The quarrel between Gutenberg on one side and Fust and Schoeffer on the other resulted in the establishment of two printing-offices in Mentz, which continued until the sacking of the town in 1462, when the art, hitherto kept a secret, was spread everywhere, as the workmen were compelled to earn their subsistence in new places. Fust and Schoeffer began again at Mentz, and Gutenberg at Eltville, a village not far from that city. The work there did not appear under his name, but the types were his. The office passed into the hands of relatives by marriage, Henry and Nicholas Bechtermüntz. After them it was in the possession of the Brothers of the Life in Common.

Printing seems to have next been done at Bamberg. The date 1461 has been assigned for this, and the name of the printer is given as Albert Pfister. Claims are also made that work was done in Strasbourg in 1458, by Mentel and Eggestein. Ulric Zell began at Cologne in 1462, Gunther Zainer at Augsburg in 1468, Henry Keffer at Nuremberg in 1469, Helyas Helye at Münster in Argau in 1470, Peter Drach in Spire in 1471, John Zainer in Ulm in 1473, Lucas Brandis in Merseburg in 1473, Conrad Fyner in Esslingen in 1473, Lucas Brandis in Lubeck in 1475, Conrad Blauberen in 1475, M. Q. and G. Reyser in Eichstädt in 1478, Dold and Reyser in Würzburg in 1479, and Marcus Brand in Leipsic in 1481. Vienna did not have a printing-office till 1482, and Munich till 1500. The art spread with great rapidity. There were sixteen master printers in Strasbourg before 1500. Schoeffer's office in Mentz did much work, but that city was soon surpassed by both Strasbourg and Cologne. In the last-named place twenty-two printing-offices existed before 1500. Ulric Zell, who dwelt there, was the first of the early printers, after the triumvirate, who made a reputation. Nuremberg had the chief printing-office of the early years of typography. Anthony Koburger was the predecessor of the Murrays, the Didots, the Cottas and the Harpers of to-day. He had twenty-four presses at Nuremberg and offices at Basle and Lyons. He began in 1473.

Block-printing did not cease at once in Germany. For years the image-printers endeavored to keep in competition with the new and more skillful art, and they even invoked the aid of the magistrates to prevent wood-engravings being used with letter-press. But their efforts were ineffectual. Slowly the new process drove out the older one, and in the end it destroyed also the trade of the calligraphers, who had been so important in the two or three centuries before. Some manuscripts were still copied in preference to the rude lettering of types.

The conditions of printing in the cradle years and for a century after varied little from those in France or in England. Many towns now prominent in printing, as Vienna, Frankfort, Berlin and Leipsic, had attained no importance then; but printing increased everywhere. The industry and painstaking of the German workman made him desirable in other countries. Germans introduced the art in France, and were among those who carried it to Italy. None of the very great improvements after the first originated with them. Stereotyping may be said to have started independently in France and England, but the English method was that introduced into Germany by John Watts, an Englishman, who learned the art in America. Electrotyping, except in an amateur way, began in America, and casting-machines for type-foundries also originated here. The improved hand-press was English, as was the first power-press, although the inventor was a German. The chief seat of the German book trade is Leipsic, where a multitude of presses are employed.. Berlin, Frankfort, Vienna (which is here treated as a German city, although beyond the geographical limits of Germany), Munich, Stuttgart and other cities do an immense amount of work, and throughout the country are found a multitude of offices which need only opportunity to show that they, too, are equal to fine and elaborate work. The early masters of wood-engraving, Dürer and Holbein, were Germans. Until the close of the last century, when Bewick revived the art in England, no contestants appeared in this field. Among the famous printers produced in Germany are Breitkopf, Trattner, Trassler, Decker, Göschen, Unger, Cotta, Härtel, Tauchnitz, Teubner, Brockhaus and Auer. Many of these were learned; some of them were type-founders, and others were booksellers on a great scale. Many had offices in which the most elaborate works could be produced. Among the more noted type-founders are Schelter & Giesecke, Genzsch, Krebs, Poppelbaum and Bauer. Printing-presses are made in many places, the successors of König & Bauer enjoying a high reputation. One of the principal developments of printing in Germany has been lithographic work. Nowhere is this better done, or in better taste, and the quantity is enormous. The art was first discovered there.

In June, 1880, there were in Germany, excluding Austria, in 1,300 cities, 2,886 printing-offices, 1,610 lithographic establishments, and 659 which combined both kinds of work, making 4,655 offices, with 3,000 hand-presses and 5,900 power-presses for type-work and 6,800 hand-presses and 1,090 power-presses for lithographing. In these places 52,000 men, 11,600 women and 8,400 apprentices were employed. Fifteen thousand books were published. Berlin had 215 offices, Hamburg 89, Munich 42, Cologne 35, Leipsic 78, Frankfort-on-the-Main 53, Dresden 40 and Stuttgart 35. Thirty-five towns had ten or more printing-offices each. There were eight type-foundries in Berlin, five in Leipsic, five in Frankfort-on-the-Main and fourteen in other places. There were eight press manufacturers in Leipsic, eight in Berlin and twenty elsewhere. Four wood-type makers supplied the need of large wooden letters, and sixteen ink-makers manufactured that commodity.

At a slightly later date a more perfect census was made of the work done in Germany, Austria-Hungary and Switzerland. It should be recollected that in this last country more than four-fifths of the people speak German. The "Swiss swords" spoken of are men who work either at case or press. The figures in 1886 were:

Number of Machines and Workmen.	Germany.	Austria-Hungary.	Switzerland.
Rotary machines	142	37	3
Four-feeder machines	27	6	2
Perfecting-machines	417	129	34
Single-cylinder machines	6,033	1,440	441
Two-color machines	190	39	11
Treadle-cylinder machines	632	99	54
Treadle-platen machines	1,791	717	220
Small hand-printing machines	869	91	45
Hand-presses	2,418	931	203
Lithographic machines	1,669	269	88
Lithographic hand-machines	204	51	20
Lithographic hand-presses	6,841	1,074	484
Foremen	1,480	513	152
Readers	841	346	75
Compositors	19,872	6,519	1,646
Women compositors	184	56	48
Apprentices to case	7,118	2,567	410
Power-press men	3,645	967	293
"Swiss swords"	1,031	149	70
Hand-press men	667	488	36
Apprentices to press	1,681	605	109
Men feeders	1,518	227	194
Women feeders	3,454	1,515	118
Lithographers	3,507	578	249
Lithographic apprentices	1,559	281	84
Lithographic power-press men	1,429	188	89
Lithographic hand-press men	5,079	854	362
Lithographic press apprentices	2,168	409	105
Lithographic men feeders	680	191	52
Lithographic women feeders	1,451	229	45

There were in Germany also 4,126 office clerks and 370 warehousemen, besides laborers engaged day by day; in Austria-Hungary there were 593 clerks and 99 warehousemen, and in Switzerland 330 clerks and 39 warehousemen. The horse-power used was as follows:

Number of Engines.	Germany.	Austria-Hungary.	Switzerland.
Steam-engines	6,209¼	955½	190½
Gas-engines	2,491⅛	303	142½
Hot-air engines	112$\frac{1}{12}$	18	1½
Water-power	566½	27½	247¼
Horse-engines	26	1	....

Several masters refused to give these statistics, and one office at Teterow, in Mecklenburg, reported that it uses wind as motive-power, working night and day when it blows favorably.

The whole number of offices in Germany at the last date was: Letter-press, 3,453; lithographic, 1,295; both combined, 834; giving a total of 5,582; in Austria-Hungary, letter-press, 757; lithographic, 165; both combined, 197; giving a total of 1,119; and in Switzerland, letter-press, 347; lithographic, 139; both combined, 36; making a total of 522. After the census of 1880 Germany had a population of 45,500,000 inhabitants, Austria-Hungary about 38,000,000, and Switzerland about 3,000,000. In Germany there is one office to 8,000 inhabitants; in Austria only one to 30,000. There were in Germany sixty-seven printers' libraries, having 33,000 volumes.

In thirty-two towns of the German empire there are eighty-six type-foundries, employing altogether 825 journeymen and 178 apprentices. Of these 172 are employed in Frankfort-on-the-Main, Berlin has 161, Leipsic 161, Hamburg 72, Munich 20, Dresden 12, Brunswick 11, and the small town of Offenbach 86.

In Germany there are 2,963 newspapers. In trade and industry there are 474 papers; agriculture, 251; law, politics, statistics and political economy, 206; education and instruction, 190; medicine, 158; history and geography, 121; commerce, 118; Protestant theology, 115; other religious beliefs, 31; Jewish theology, 19. Bibliography and the book trade possess thirty-three representatives, while shorthand shows no less than fifty-seven papers.

Newspapers are very numerous in Germany. Nowhere, except in the United States, are more printed to a given population. Many of them are of a very high character, and are written by men of judgment and experience. Others are scarcely more than a register of advertisements. Many technical and scientific journals and magazines are issued. Books are usually sent forth unbound. The quality of wood and copperplate engraving done in Germany is very high, but books do not usually appear as well as they should on account of the poor quality of paper employed. The colored work with type and borders is excellent.

The entrance into the printer's trade in Germany was at one time closely guarded. Each man had to serve an apprenticeship, being legally indentured, and he was formerly obliged to spend a year or more on his travels so that he might improve his art. These years were described as Wanderjähre. In most of the countries known elsewhere as Germany he was obliged to show a certain income before he could marry, and when he became a master printer his way was surrounded by thorns. The laws regulating the press are very strict.

Get In.—Directions to thin space or not to space widely, so that more matter may come into a certain number of lines. The contrary is to drive out.

Getting the Pitch.—An English expression for setting the form of type at the right distance from the edge of the machine.

Gevierte (Ger.).—The em quadrat.

Giesszettel (Ger.).—The bill of type; the list of letters and their quantity, as obtained from the typefounder.

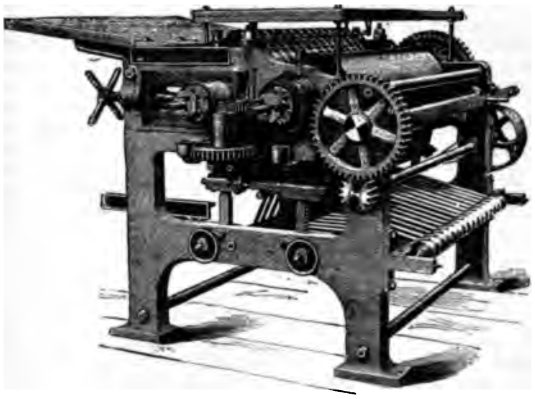
Gift.—A clique or sub-society of pressmen in London. To get work in many London offices it is not enough that the pressman shall belong to the same society or union as the other men. He must also be a member of their gift, which may possibly extend to half a dozen or a dozen places of business. Should he attempt to do anything in either of these pressrooms without being a member of the gift which holds control, the other workmen would make life unpleasant to him. The gifts are known as the Lion's gift, the Tiger's gift, or by some other meaningless name. They meet in public-houses.

Gilding.—Gilding is applied in binding to the upper side or edge of a book, but rarely to the lower, and is also used for the title and ornaments on the back and side. In all good work gold-leaf is used. This is very thin, and must be handled with great care. When lettering is done by hand the letters are set up and properly spaced, and placed in a type-holder in which their faces must be made perfectly level before the type case or holder is screwed up. Thus arranged they are warmed over a finishing-stove, gas flame or charcoal fire until they attain the proper temperature, and are then carefully worked in blind, by pressing the types uniformly upon the surface to be lettered. The lettering space is then dampened with vinegar and when dry the impressions are penciled in twice with glair, after which a strip of gold-leaf is laid on and the impression is renewed, care being taken that it shall exactly cover the places where it has previously been worked in blind. Sometimes hand-letters—each letter being fixed in a handle—are employed; but this is a method falling into disuse and not certain to give a uniformity of results. If not hand tooled, the book or its cover is inserted in a press, when a heated die comes down against it. This is a very much swifter operation than the other, and the die can be applied with the same certainty. It gives, however, no opportunity for variation or the display of individual skill. When the cover is first withdrawn from the press it looks very much as it did when it went in, the forms of the letters being at first scarcely visible, but when the superfluous gold-leaf is wiped away they come fully into view, distinctly defined, and extremely brilliant and beautiful. The superfluous gold is rubbed off with a rag, a piece of spongy rubber being used to clear away the gold not taken up by the rag. As fast as the rag or rubber becomes filled with gold it is put away, and when a quantity accumulates the whole is melted and the superfluous gold recovered.

When the edges are gilt the book is put into the press straight. If unsized, the paper should be sized and left to dry. Then it is to be scraped flat and perfectly even. A mixture of black-lead and thin glair is to be painted over the edge and well brushed with a hard brush until it is dry. The edge is again glaired, after which the leaf is applied, and after becoming thoroughly dry it is burnished, which brings out the beauty. Gilding may also be done over red, in which case no black-lead is used.

Designs and lettering for cheap books are done with a yellow composition known as German metal, which looks much like gold, but is much cheaper. It becomes black in time. No trouble is taken to save waste metal, and each book-cover, after being stamped with the hot die, is simply put through a brushing-machine.

Gill's Hot-Rolling Machine.—A machine, originally of American origin, but now manufactured at Reddish, England. Sheets are fed into it just as they are in a common press. They pass through polished hot rollers under pressure, the operation thinning, drying and calendering the paper rapidly. The machine is much more valuable in England than it would be here, as paper is there usually worked wet, thus taking off the gloss, which is restored by the pressure, and the ink is set and the paper dried by the same process. Very few of these machines are used in America.



GILL'S HOT-ROLLING MACHINE.

Girths.—The leathern straps which are fastened to the barrel of the rounce in the ordinary hand-press. One leads to the front of the press and is there secured, and the other is similarly held at the rear. When the rounce is turned one of these becomes taut and winds on the barrel, the bed advancing in that direction. The other strap or girth is unwound at the same time that the first one is wound.

Giustificare (Ital.).—To justify. In addition to the English meaning of giving the lines their exact length, it means to set a measure and to make the page of the right length.

Giving Out Paper.—When paper arrives from the mill or the dealer it is in reams or their multiples. It is receipted for, placed in a convenient spot, and finally given out to the pressman. There would be nothing more to be said if paper was always perfect and if no sheets were ever destroyed or injured upon the press; but losses unfortunately happen from all of these causes. Customers give orders for so many copies of a work or of a job, and enough must be printed to allow for all waste or spoiling. It is the right of the customer when he asks for a thousand copies of a job to have that very number, and not nine hundred and sixty or seventy. The printer has some spoiled sheets on hand, it is true, but to allow for them he should have given out in the beginning a thousand and thirty or forty sheets, or whatever amount would overcome the tendency to smaller numbers. On Japanese paper, for instance, which is very costly, the waste may be from one-tenth to one-third. Full count must be given, nevertheless.

Most papers, remarks De Vinne, are put up in folded quires of twenty-four sheets, making four hundred and eighty sheets to the ream. The two outer are of inferior quality to the inner eighteen quires. On common printing this inferiority is in most cases too imperceptible to deserve notice; on nearly all grades of writing-paper most of the outside sheets are imperfect and should not be mixed with the perfect quires. The amount of imperfection in the outsides varies with different makers. As a rule it is not safe to allow more than four hundred and forty perfect sheets to the ream of writing-paper; on some papers not more than four hundred and thirty-two sheets. In making up first-class blank-books from fine writing-papers it was formerly the custom to allow only twenty-two sheets to the quire. The forty sheets over were reserved for outside or fly leaves and for waste in ruling. After a time it became a custom with many blank-book makers to count twenty or eighteen sheets as a quire, and finally they lowered their standard to sixteen, fifteen, or even fourteen. This naturally produced a reaction, and now many first-class stationers count twenty-four or twenty-five sheets to the quire, and assume all the wastage themselves.

In job-work, the size of the job being known, a calculation is made as to the size of paper which will most accurately fit the work. Thus 4 by 9 inches will cut to advantage from 24 by 36 paper, but there would be a waste on 22 by 32 or 24 by 42. When the job is very large, and time enough is given, it will pay, where any particular sizes are required, to order the whole to be specially made at a paper-mill. There is such a variety of job-work that it is impossible to make any statement on waste which will answer for all kinds. Small editions are more wasteful than large, and fine work than coarse. Colored work spoils a great deal. Much also depends upon the quality of the paper, thin and weak paper wasting more than that of good, firm quality. In giving out paper for printing books in long editions the margin of waste differs with the nature of the paper and the quality of presswork. On the commonest kind of book and pamphlet presswork the usual allowance is forty-three quires to the thousand sheets, which gives a surplus of thirty-two sheets to the thousand. On finer work forty-four quires are needed, a surplus of fifty-six sheets. For wood-cut presswork of the best quality, or for presswork in many colors, a larger allowance is needed, if perfect copies are insisted on. When five hundred copies are wanted of any full sheet, blank or job, 5 per cent. (or twenty-four sheets) must be added to the ream of four hundred and eighty sheets to make up the full complement. To allow a fair margin for the inevitable waste in handling and bad feeding, and to give, as every fair printer desires, a surplus of a few sheets over, it is necessary to add another 5 per cent. to the four hundred and eighty sheets, making a total of five hundred and twenty-eight. Much paper is now made in reams of five hundred sheets. In calculating upon paper it is always well to see whether it cannot be printed in double size or even larger, duplicating the forms by electrotyping or stereotyping; thus the handbill above spoken of, 4 by 9 inches, could be printed twenty-four at a time, and in a week a printer could turn out from one press a million and a quarter.

Glair.—The white of eggs beaten up, much used in bookbinding.

Glanzdeckel (Ger.).—Smooth cardboard.

Glasear (Sp.).—To calender (paper); glaseado, calendered.

Glasgow.—The principal city of Scotland and an important printing centre. The art early achieved much prominence there from the efforts of two brothers, Robert and Andrew Foulis, distinguished alike for the beauty and the accuracy of their work.

Glätten (Ger.).—To calender.

Glazed Boards.—The sheets of mill-board used in the standing-press.

Glazed Paper.—Paper the surface of which is very hard and shiny.

Glen, James.—An early Boston printer. He was employed by Sewall after Foster's death.

Glosilla (Sp.).—Type of seven-and-a-half point body.

Gloss.—An additional lustre given to any substance by pressure or the admixture of some other material, but used in printing concerning printing-inks and the face of paper or cards.

Glossary.—A dictionary of difficult words or phrases in any language, writer or calling; a dictionary or vocabulary of obscure or antiquated words.

Glossing-Machine.—A machine to varnish the surface of a printed sheet, so as to give it additional lustre. See VARNISHING.

Glover, Josse.—A clergyman in England at the beginning of the seventeenth century who interested himself in the college then starting at Cambridge, Mass., and desired also to provide it with a printing-press. He was rector of Sutton, in Surrey, from 1628 to 1636, when he tendered his resignation for the purpose of coming to New England. He preached in London concerning the new colony, and traveled through parts of England endeavoring to obtain funds for the college, which had already begun. The records of Harvard College say that "Mr. Josse Glover gave to the college a font of printing letters, and some gentlemen of Amsterdam gave towards furnishing of a printing-press with letters forty-nine pounds, and some more." The "benefactors to the first fonts of letters for printing in Cambridge, in New England, were Major Thomas Clark, Capt. James Oliver, Capt. Allen, Mr. Stoddard, Mr. Freake and Mr. Hues." Glover embarked in the summer of 1638, with his family, consisting of his wife and five children, in the John of London, and died on the passage. He had with him a printing-press, and a printer (Stephen Daye) who was to superintend the printing, and also three men-servants to work the press. Mrs. Glover, who had been Elizabeth Harris, afterwards married the Rev. Henry Dunster, president of Harvard College, and died in 1643. Mr. Glover had considerable property in New England; he had two sons and three daughters, and one of his sons graduated at Harvard in 1650. The press was set up in Mr. Dunster's house.

Glue.—A material derived from the hoofs, hides, &c., of animals by boiling; it is much used in binding. When good it may be immersed in water for a whole day without dissolving, but swelling up, while inferior glue will partly or entirely dissolve. It should be of pale color, but this is imitated in some qualities by bleaching with acid. When it is to be put to use it should be broken up and soaked for twelve hours, then boiled and turned out into a pan to get cold; when cold pieces may be cut out and placed in the glue-pot as desired. It loses much strength by frequent remelting. It should always be used as hot as possible. Glue is one of the two principal components in roller-making. It is broken up into bits, soaked in water, and melted at a low temperature, then being mixed with molasses. This compound is not a true chemical one. The glue forms the basis, and little by little the molasses escapes or dries up. It is very tender when new, but when old it is like a hard piece of india-rubber.

Glycerine.—A non-crystallizable, oily, viscid, colorless and odorless liquid, possessing a sweet taste, and employed for a very large number of purposes in a printing-office. It is soluble, and mixes readily in all proportions with water, alcohol and chloroform. It has solvent powers, does not freeze at ordinary temperatures, is not volatile and is of value as a preservative agent. Dearing gives the following as among its valuable properties for printers:

Type which has been papered and kept for a long time sometimes sticks badly. It can easily be separated by pouring a little glycerine over it, leaving it over night, and then washing it off with warm water. Offsets are prevented by rubbing glycerine on the tympan-sheet, instead of oil. It is much superior. Old rollers, too hard and dry, can often be renovated and made to do good service by giving them a coat of glycerine after washing. Rub well with the hand, let stand a day, or as long as the condition of the roller may require, then sponge off and allow to dry to the right suction. Glycerine is used instead of molasses in making rollers.

Ink can be prevented from skinning over by covering the top of the can with a thin layer of glycerine. A bare coating is sufficient. A flexible compound for paper pads can be made by taking one part sugar, one part linseed-oil, four parts glycerine, eight parts of glue or gelatine, and a little aniline dye to give color. Cover the glue or gelatine with water and soak for half an hour to soften. Pour off all of the water and melt it by heating in a pail or basin placed in another kettle containing boiling water. After melting, put in the sugar and glycerine, remembering to stir well; add the dye, and then thoroughly stir in the oil.

Godfrey Gripper-Machine.—A small job press of the platen kind, manufactured in London. It prints 16 by 10½. The heap to be printed is laid by the feeder in such a way that sheet after sheet is caught by grippers without attention and held by them during the entire process of printing. When that is completed other grippers lay it on the pile. The feeder does not need to put his hand in any dangerous position to feed or to take off, and the inventors claim an average speed of 2,500 an hour, which can be doubled on much work. Specimens showing the work at 2,500 an hour are very good.

Gods.—The nine quadrats used in throwing or jeffing by compositors. This expression is not used in America.

Going Up the Form.—Beating from the hither towards the farther side is, in pressman's phrase, called "going up the form."—*Moxon.*

Gold.—The heaviest and most valuable of the metals obtained in any abundance. It is exceeded in specific gravity by platinum, and in value by one or two very rare metals. Its density is 19.3. It is distinguished by its yellow color, by the beautiful polish which it takes, and by its pre-eminent ductility and malleability. It can be beaten into leaves which will require 282,000 to equal an inch in thickness, and the wires made from it are the smallest that the art of man can compass. It resists the attacks of nearly all acids and compounds. In the printing trades it is employed as gold-leaf in bookbinding.

Gold Bronze.—Very fine powder used in gold printing. It is dusted on after the form is printed with a preparation specially made for the purpose.

Gold-Cushion.—A padded cushion, about 12 by 6 inches, covered with white calf, the rough side outwards, upon which the gold-leaf used in bookbinding can be laid and cut.

Gold Edges.—Another term for gilt edges.

Gold Ink.—Ink of a golden color; it sometimes has particles of bronze mixed with it.

Gold-Knife.—A knife used for cutting gold-leaf. It is long and straight.

Gold-Leaf.—Gold beaten into very thin leaves—occasionally used for printing purposes, but more particularly for the decoration of book covers and edges. It has been employed from the most ancient times. The Egyptians ornamented with it their furniture and sarcophagi, on which the gold is still to be seen. Their gold was beaten out between the membranes of the intestines of an ox, while the Greeks and Romans employed parchment. The Roman poets make occasional allusion to gilding, one comparing it to the brilliant gloss of a spider's web illuminated by the sun, and another adapting the word as a synonym of the luminous vapors seen about the setting sun. In all succeeding times the practice of beating out the leaf between parchment or membranes has never been departed from, and no device has been invented to supersede hand manipulation in bringing the leaf to its required thinness. From one hundred and fifty thousand to two hundred thousand leaves make an inch in thickness, three or four hundred being equal in that respect to a common sheet of paper. Even the rays of the sun will pass through such leaves, and the color of the object on which it is laid will frequently be distinctly shown. One common method of gilding edges is to have gold over red. The tints of gold-leaf vary from deep orange red up to a pale silvery hue. Pale leaf-gold is an alloy of silver and gold: deep hues are usually intermixed with a slight amount of copper. Dutch gold is copper-leaf colored yellow by the fumes of molten zinc. Various solutions are also used to alter the tint of gold-leaf when laid. The best gold-leaf is prepared from gold containing 1¼ per cent. alloy of copper.

Gold with its alloys is first cast in ingots, then rolled into sheets, which are cut into squares and subjected to the hammering process on the anvil. First the plates are extended to the size of the packs, four inches square, when they are cut into four pieces and again hammered. A third hammering is given to the pieces when they have reached the size of the pack and been subdivided. The one hundred and fifty pieces with which the hammering began are now increased to twenty-four hundred pieces. The process of hammering is long and tedious, and requires the nicest determination of the force and direction of the blows. The anvil itself is convex at the top; so also is the hammer. When the sheets of metal have attained a certain thinness they are placed between the prepared skin. The beater never strikes consecutively in the same place. A sense of feeling as well as of observation is required to ascertain when the metal is sufficiently thin. During the subsequent separation and sorting of leaves all draft has to be carefully guarded against. The first hammer used weighs sixteen pounds, the second twelve pounds and the last ten pounds. The gold is laid into books of twenty-five leaves each, the paper of which is first smoothed and rubbed with red chalk to prevent the leaves from adhering. Dutch metal is sold in bundles of twenty-five hundred leaves each.

Gold Preparation.—Any adhesive varnish which may be used for gold printing.—*Southward.*

Gold Printing.—In letter-press printing any work executed in gold or in the bronzes which resemble gold. The methods with bronze are explained under that word. With gold-leaf it does not vary much from the plan followed by bookbinders. It is nearly always upon silk or satin. A dried glair preparation is placed upon the silk, the form is heated so that the type is hot, and the impression is then taken. Gold size can be used for the printing, laying the gold-leaf upon it afterwards. The impression in both cases should be strong.

Goldschnitt (Ger.).—Gilt edges.

Good Ads.—In England, live advertisements.

Good Color.—Sheets printed neither too black nor too light.

Good Copy.—Plain, legible and straightforward manuscript or reprint. This is applied to fat copy also.

Good Matter.—Composed type not printed, or ordered to be kept standing with a view to reprinting. An English expression.

Good Night.—The finish of copy by telegraph is indicated by the words Good Night, written at the end.

Good of the Chapel.—Forfeitures and other chapel dues collected for the good of the chapel, to be spent as it approves. See CHAPEL.

Good Work.—This is so called in a twofold sense. The master printer calls it good work when the compositors and pressmen have done their duty, and the workmen call it good work if it be light, easy work, and they have a good price for it.—*Stower*.

Goose.—A printers' abbreviation for wayzgoose, or bean-feast, the festival given in England by master printers to their workmen. These words, or anything similar to them, do not appear ever to have been used in America.

Gordon, George P., inventor of the Gordon press, was born at Salem, N. H., in the year 1810. He learned the printer's trade, and early embarked in business in New York, having a small office there for a number of years. In 1834 or 1835 he began making experiments in the construction of card-presses, but did not apply for a patent until 1850. The preceding job-presses had been very unsatisfactory, and the one he brought out at this time had many defects, which were afterwards remedied. In all he built more than one hundred kinds. Among his presses was the Firefly, which was fed with strips of cards, and could turn out ten thousand an hour. About 1858 he invented the Franklin press, more generally known as the Gordon, which was very successful, and is still largely made. After beginning the press manufacturing business he abandoned printing, and after a while put up a factory of large size at Rahway, N. J. He died, leaving a large estate, on January 27, 1878.

GEORGE P. GORDON.

Gordon Press.—A small press used in job-work and originated about 1858. It has a rotating ink-distributing disk, inside of which is another ink disk, revolving in the contrary direction, but both very slowly. By this means an excellent distribution of the ink is effected, as the rollers pass over an entirely new surface every time they reach the disks. It is a strong press and well put together.

Gótico (Sp.).—Black-letter or Old English; Gótico aleman, German text.

Gothic.—Several meanings attach to the word Gothic in printing. As used generally by writers it means the type which bears a certain sort of resemblance to the present German and the Old English, but which preceded them.

The common meaning of Gothic among printers is that it is a certain kind of Roman type, without serifs or flourishes, and having the whole character made of a single thickness of stroke; thus: H. It is probably the most legible type made, when only used for a few words; but when a large quantity is employed together its monotony and blackness destroy this effect. It is much used in posters and handbills, programmes, and in fact all kinds of work excepting in books, where it is proscribed.

Gothique (Fr.).—Gothic. This is used in French as synonymous with black-letter; the American expression Gothic, a letter without serifs and with lines all of the same weight, has no relation to it.

Gouge.—A tool used in finishing in bookbinding; the cutting-edge is a line forming the segment of a circle.

Goupil Gravures.—Fac-similes of water-color paintings. They are printed in colors from photogravure plates. The plate is inked by hand in different colored printing-inks, and the picture is printed by one impression. The plate is then cleaned and again inked in colors for another impression, and so on.

Gozne de Cardán (Sp.).—Universal joint.

Graining-Boards.—Boards having indentations or graining upon which the leather used in bookbinding is laid and pressed, thus giving that material the appearance required. Metal plates which are known as graining-plates are also used for the same purpose.

Grammar.—A thorough acquaintance with English grammar is of great use to printers, who are always expected to correct some of the worst grammatical lapses. Frequently, also, a writer will ask to have his matter made straight. On daily newspapers, where the copy is written hurriedly, it is impossible to show proofs to writers, and besides the proof-reader would not generally know from whose pen a faulty sentence came. Nevertheless, the paper must be grammatical. The proof-reader is not expected, however, to change in cases where the error can only be discerned by some rule not generally known, or where there is a difference of opinion. Faulty etymologies, such as "dilapidated" in connection with a hat, can rarely be corrected. This comes from lapis, a stone. A building can be dilapidated, as it may fall to pieces. It becomes unstoned. English grammar is the simplest used in any language which uses type and has many books. At the same time its words must be employed according to the senses given by the best authors, and neologisms or words in new uses are regarded as very objectionable.

The only error into which a proof-reader is likely to fall with articles is to discover whether the following word begins with a silent h, as in "an historical" or "a historical." Opinions are divided in this country on the propriety of adding an n to the article in this case. In America we nearly always say "a hospital," but in England "an hospital." No rule can be given on five or six of these words that all will adhere to.

Errors in nouns are in wrong usage, not attending to the examples of good writers, and in the formation of plurals. Some erroneous plurals are still used, as "seraphims" and "cherubims."

The adjective forms its comparative and superlative by adding er and est, except in words of more than one syllable. Yet it is by no means an error, although it may be inelegant, to add these suffixes to polysyllables. So also more and most can be used with words of one syllable, as most good. An offense against taste or a good ear is not necessarily a fault in grammar.

In pronouns care should be taken, where one is separated at some distance from the verb which governs it, that the objective case is not used where the nominative case should be. The verb "to be" is followed and preceded in all cases by the nominative case. There is really no distinction between the nominative and objective cases in nouns; there the classification is purely ideal. But pronouns have an objective case in him, her, me, and so on.

The verb and its agreement with its nominative form the chief stumbling-block in English grammar. When the two words are against each other almost the only chance of error is in treating a collective noun as singular where it should be plural, or the contrary. It is good English to say the "army is" or the "army are," but it is not good English to use one in one place and the other in another place. Generally speaking, it is better to treat collective nouns as singular, but this cannot always be done. The inquiry in a doubtful sentence should be to discover to which noun a verb refers, and make these two words agree. Throw aside all of the remainder of the sentence for the time being.

The imperfect should be distinguished from the past participle, and neuter verbs should be distinguished from active verbs. Thus it is wrong to say that the "hen sets," which should be that she "sits." Lay and lie and a number of other words should be similarly distinguished. Two or more singular nominatives require the plural verb just as much as one plural nominative. A disjunctive conjunction requires the singular verb, even where there are two nominatives. Participles are used as adjectives, as in a "walking gentleman," but no word ending as a participle and apparently a participle can thus be used unless there exists a verb from which the participle has been regularly formed. The same rule exists with the past tense used as an adjective, as, for instance, "talented." There is no verb "to talent," and consequently there can be no "talenting" or "talented." The mark of the infinitive must never be separated from the verb itself. "To justly consider," therefore, is wrong; the words should be "justly to consider," or "to consider justly." Adverbs cannot be used interchangeably with adjectives, but there are some words which are both, as "well." Prepositions always govern the objective case, even though the objective is at the beginning of a sentence, as "Who was it by?" should be "Whom was it by?" or more easily, transposed, "By whom was it?" Many prepositions have a special force or use from long association with a particular word, and it therefore becomes necessary to write them in such a relation. The reason why "reliable" is regarded as being wrong is that rely is always followed by upon or on; therefore the compound should be "relionable" or "reliuponable." Prepositions as a rule should not be at the end of sentences, nor should other small words; yet it is better to leave them there than to have the sentences harsh and awkward. Grammar is an attempt to state the correct usages of a language, but the grammar of necessity must always be less full than the speech, as some combinations occur so infrequently that no settled customs exist, and in this case a good ear must decide.

Long or awkward sentences are best mended, where authority exists for the change, by dividing them up into several shorter sentences. It is better to repeat nouns, pronouns and verbs than to run the risk of confusion by leaving them out. While words should be employed in their classical usage, there are occasions when the whole value of an expression depends upon some one pungent word for which authority cannot be given, as John Randolph's "doughface," denoting somewhat nearly what Halifax would have termed a trimmer. There must have been a time when no word had an authority. Foreign words should be avoided. Everything can be told in English.

There are several hundred grammars of the English language. As simple and valuable as any are Bullions's and Greene's. Brown's Grammar of English Grammar is the largest in English, and has much valuable matter. Cobbett's Grammar has a wonderful number of examples of ungrammatical language. There are many books which deal with false English. Latham's is a good historical grammar.

Gran Canon (Sp.).—Large canon; a name given in Spain to type of forty-two points.

Gran-Cassa (Ital.).—A case in which certain sorts have run out, although others are abundant.

Grand Capitales (Fr.).—Capitals.

Grand Papier (Fr.).—Large paper.

Granear (Sp.).—To rub or file the sides of type.

Grangerising.—To grangerize is to take a book to pieces, interlay the leaves on larger sheets of paper, and to insert between them prints illustrating the text, also on paper to match the other leaves. This is so called after the Rev. James Granger, who about 1750 conceived the idea of writing a History of England with the special view of its being extra-illustrated by the insertion of prints, principally portraits. The fashion has continued from that time down to the present. Very few of the prints could be obtained apart from books, which were ruthlessly despoiled that their illustrations might be used elsewhere, and they of course were rendered worthless from the point of view of the collector, who desires only perfect copies. It is not an uncommon thing to see a thin duodecimo extended to a thick quarto, and one work published in this city, originally having only one hundred and fifty pages, has been extended to seven thousand. When this is done systematically the book is read through, pen in hand, and every name and every allusion noted that can possibly be illustrated. An effort is then made to obtain prints that bear upon them. Bookstores and libraries are ransacked. Many can easily be obtained, but for others there must be years of waiting. John Bagford, an English shoemaker, projected a History of the Art of Printing, which was to be grangerized with the titles of rare books. He tore out all of the titles that he could obtain in both public and private museums, and accumulated no less than forty volumes of titles, representing the mutilation and destruction of thousands upon thousands of bibliographical treasures. Theatrical books are very often treated in this way.

Graphic Machine.—A single-cylinder machine, so named because first used for the Graphic newspaper, in England.

Grappe (Ital.).—A brace.

Grass-Hand.—A compositor temporarily engaged in the place of another, a practice common in newspaper offices. An English expression. In America he is known as a "sub," or substitute, the other term not being used.

Grassing.—A compositor in England taking occasional jobs, or assisting on a newspaper; subbing.

Grattoir (Fr.).—An ink-slice.

Graveur de Caractères (Fr.).—Letter-cutter.

Graveurs (Fr.).—Engravers.

Gravure (Fr.).—Engraving, cutting; gravures, engravings.

Grease.—A slang expression in England for the more technical one of fat; that is, good work.

Great Britain.—The British Islands, comprising England, Ireland, Scotland, Wales and the Channel Islands. The printing trade is carried on in all parts, and in England and Scotland to a very great extent. Nearly all work is in English. The other tongues in which work is done, according to the order of importance, are Welsh, French and Gaelic. Erse and Manx require very little. In 1892 there were published in the United Kingdom 2,255 newspapers, of which there were in England 1,763, 1,302 being in the provinces and 461 in London. Wales had 95 newspapers, Scotland 206, Ireland 167 and the British isles 24. Of these there were published daily in England 138, Wales 6, Scotland 20, Ireland 19, and two in the Channel Islands. In 1846 there were published in the United Kingdom 551 journals, 14 being daily. Twelve of the latter were in London and two in Dublin. There are at present 1,901 magazines and reviews.

Great Numbers.—Long working numbers in printing were once thus called.

Great Primer.—A large size of printing-type, chiefly used in bookwork in printing pulpit Bibles. In job-work it affords many display faces. Great primer is double bourgeois, or four lines diamond in size, and is a little smaller than three-line nonpareil, with which, however, it is equivalent on the point system, which reckons this as eighteen points. Four lines and a quarter make an inch. In French it is known as gros Romain or gros texte, the bodies of which differ, the former being a long primer and a brevier, which is a true great primer, and the latter two breviers, which is a Columbian. In German it is called Tertia, in Dutch text, in Italian testo and in Spanish gros romain or doble breviario (sixteen points). Eighteen point is called petit parangon.

This line is in Great Primer.

Greek, Composition in.—This is the only Western language having much literature in which the characters are formed in a manner unlike the Roman. German and the other tongues which use black-letter also employ Roman, and the difference between the Fraktur and the ordinary characters is slight compared with that which exists between either of them and the Greek. In form most Greek is like Italic; it is inclining. In lower case there is very little appearance of anything like a serif, although the capitals are provided with them. As a rule the body marks are heavier than for the corresponding size in Roman.

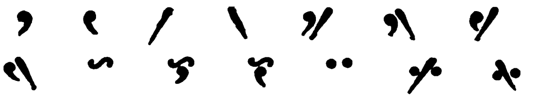
The Greek language is in capitals and small letters, like the English, there being seven vowels and seventeen consonants. Some of these have two or more forms, and many of the letters are modified by accents or breathings. The following are the characters, with their English equivalents and their power.

Forms.		Names in Greek and English.		English Equivalent.	Numerical Value.
Α	*α*	*Ἄλφα* . .	Alpha	a	1
Β	*β ϐ*	*Βῆτα* . .	Beta	b	2
Γ	*γ*	*Γαμμα* .	Gamma	g	3
Δ	*δ*	*Δέλτα* . .	Delta	d	4
Ε	*ε*	*Ἔψιλόν* .	Epsilon	short e	5
Ζ	*ζ*	*Ζῆτα* . .	Zeta	z	7
Η	*η*	*Ἠτα* . .	Eta	long e	8
Θ	*ϑ θ*	*Θῆτα* . .	Theta	th	9
Ι	*ι*	*Ἰῶτα* . .	Iota	i	10
Κ	*κ*	*Κάππα* .	Kappa	k	20
Λ	*λ*	*Λάμβδα* .	Lambda	l	30
Μ	*μ*	*Μῦ* . . .	Mu	m	40
Ν	*ν*	*Νῦ* . . .	Nu	n	50
Ξ	*ξ*	*Ξῖ* . . .	Xi	x	60
Ο	*ο*	*Ὄμικρον* .	Omicron	short o	70
Π	*π*	*Πῖ* . . .	Pi	p	80
Ρ	*ρ*	*Ῥῶ* . . .	Rho	r	100
Σ	*σ ς*	*Σίγμα* .	Sigma	s	200
Τ	*τ*	*Ταῦ* . .	Tau	t	300
Υ	*υ*	*Ὑψιλόν* .	Upsilon	u	400
Φ	*φ*	*Φῖ* . . .	Phi	ph	500
Χ	*χ*	*Χῖ* . . .	Chi	ch	600
Ψ	*ψ*	*Ψῖ* . . .	Psi	ps	700
Ω	*ω*	*Ὠμέγα* .	Omega	long o	800

Sixteen of these letters are said to have come from the Phœnician Cadmus (about 1500 B. C.). These are *Α, Β, Γ, Δ, Ε, Ι, Κ, Λ, Μ, Ν, Ο, Π, Ρ, Σ, Τ* and *Υ*. Four, according to Pliny, were added by Palamedes at the time of the Trojan war, being *Θ, Ξ, Φ* and *Χ*; and four by Simonides of Cos during the Persian war, being *Ζ, Η, Ψ, Ω*. The *Θ* and *Χ* are also attributed to Epicharmus of Sicily. The ancient letters were all uncial, or what we should call capital; the present cursive or round letters occur first in inscriptions of the time of Augustus, and resemble the Coptic shapes. The cursive characters, with a multitude of ligatures, have been in constant use since the tenth century of the current era. The Greeks wrote originally from right to left, afterwards alternately both ways, and lastly from left to right.

It will be noticed that the order is not the same as in English, g, z and x being transposed forward, two o's, long and short, being used, th, ch, ph and ps being added, and c, f, v, w and y being omitted, although in our older books the upsilon is nearly always transliterated as y. There are no Italics or small capitals. There is an astonishing number of accents, or what are commonly called such by the English reader, which are however entitled by Greek grammarians accents and breathings. These are very minute, and are usually cast upon the body, but under some circumstances may precede or go over the letter. The use of all of them is governed by strict rules.

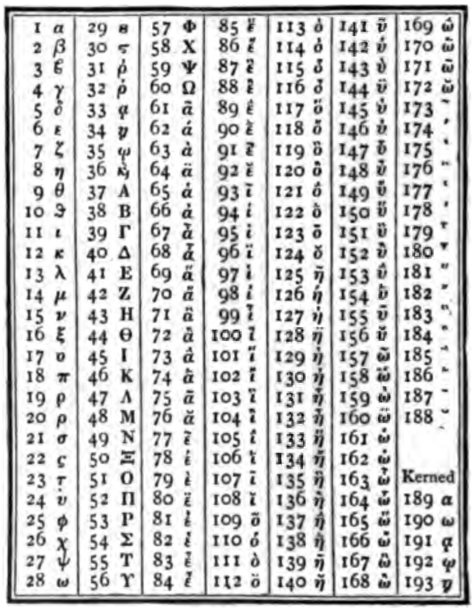
The accents and aspirates are shown on a magnified scale in the lines below given. Their explanation is as shown in the table herewith:



GREEK ACCENTS AND ASPIRATES.

᾿ Lenis.
῾ Asper.
´ Acute.
` Grave.
῎ Lenis acute.
῍ Lenis grave.
῞ Asper acute.
῝ Asper grave.
῀ Circumflex.
῏ Circumflex lenis.
῟ Circumflex asper.
¨ Diæresis.
΅ Diæresis acute.
῭ Diæresis grave.

In combination with the various letters the accents are thus shown by Caslon, the eminent British type-founder:



1 α	29 ϖ	57 Φ	85 ἒ	113 ὃ	141 ῦ	169 ω̈́
2 β	30 ϛ	58 Χ	86 ἓ	114 ὀ͂	142 ύ	170 ω̈̀
3 ϐ	31 ῤ	59 Ψ	87 ἐ͂	115 ὁ͂	143 ὺ	171 ω̄
4 γ	32 ῥ	60 Ω	88 ἑ͂	116 ο̈́	144 ϋ	172 ω̆
5 δ	33 ᾳ	61 ᾶ	89 ε̈́	117 ο̈̀	145 ὐ	173 ῀
6 ε	34 ȣ	62 ά	90 ε̈̀	118 ο̄	146 ὑ	174 ´
7 ζ	35 ϕ	63 ὰ	91 ε̄	119 ο̆	147 ὔ	175 `
8 η	36 ϗ	64 α̈	92 ε̆	120 ο͂	148 ὕ	176 ¨
9 θ	37 Α	65 ἀ	93 ῖ	121 ό	149 ὒ	177 ᾿
10 ϑ	38 Β	66 ἁ	94 ί	122 ὸ	150 ὓ	178 ῾
11 ι	39 Γ	67 ἄ	95 ὶ	123 ο̄	151 ὖ	179 ῎
12 κ	40 Δ	68 ἅ	96 ϊ	124 ο̆	152 ὗ	180 ῞
13 λ	41 Ε	69 ἂ	97 ἰ	125 ῆ	153 ΰ	181 ῍
14 μ	42 Ζ	70 ἃ	98 ἱ	126 ή	154 ῢ	182 ῝
15 ν	43 Η	71 ἆ	99 ἴ	127 ὴ	155 ῡ	183 ῏
16 ξ	44 Θ	72 ἇ	100 ἵ	128 η̈	156 ῠ	184 ῟
17 ο	45 Ι	73 α̈́	101 ἲ	129 ἠ	157 ῶ	185 ΅
18 π	46 Κ	74 α̈̀	102 ἳ	130 ἡ	158 ώ	186 ῭
19 ρ	47 Λ	75 ᾱ	103 ἶ	131 ἤ	159 ὼ	187 ¯
20 ϱ	48 Μ	76 ᾰ	104 ἷ	132 ἥ	160 ω̈	188 ˘
21 σ	49 Ν	77 ε͂	105 ΐ	133 ἢ	161 ὠ	
22 ς	50 Ξ	78 έ	106 ῒ	134 ἣ	162 ὡ	
23 τ	51 Ο	79 ὲ	107 ῑ	135 ἦ	163 ὤ	Kerned
24 υ	52 Π	80 ε̈	108 ῐ	136 ἧ	164 ὥ	189 α
25 φ	53 Ρ	81 ἐ	109 ο͂	137 η̈́	165 ὢ	190 ω
26 χ	54 Σ	82 ἑ	110 ό	138 η̈̀	166 ὣ	191 ᾳ
27 ψ	55 Τ	83 ἔ	111 ὸ	139 η̄	167 ὦ	192 ῳ
28 ω	56 Υ	84 ἕ	112 ο̈	140 η̆	168 ὧ	193 ῃ

LIST OF GREEK CHARACTERS AND ACCENTS, AS SHOWN BY CASLON.

Most of the diacritical marks are used with vowels, either alone or combined together as diphthongs. The vowels are *α, ε, η, ι, ο, υ* and *ω*, the proper diphthongs *αι, ει, οι, αυ, ευ, ου*, and the improper diphthongs *ᾳ, ῃ, ῳ, ηυ, ωυ* and *υι*. The *ᾳ, ῃ* and *ῳ* have the second letter (ͅ) of the diphthong written underneath. This is called iota subscriptum, and is generally so written with these letters. But when capitals are used the iota is written in at length, as *ΔΕΣΠΟΤΗΙ = δεσποτῃ*.

Every word in Greek which begins with a vowel or diphthong has a mark over this initial vowel or diphthong called a breathing; it is placed over the second vowel of a diphthong, as *ἔχω, αἶξ*. There are two kinds of breathings, the rough and the smooth, generally known by the names of spiritus asper and spiritus lenis. The rough breathing gives the power of the letter h to the vowel, as in *οἱ*, pronounced hoi, and *Ἕκτωρ*, Hector. The mark is like a turned comma. The smooth breathing seems to have no power. It is shown by a mark like a comma over the letter, as in *ἀνήρ*. The letter r or rh has a rough breathing over it at the beginning of a word, and when two *ρ*'s come together in the centre the second has this mark, the other having the smooth breathing, but there is no rough breathing when there is only a single *ρ*. In some modern editions the breathings over *ρρ* are omitted.

Nearly all Greek words have an accent, but very few have more than one. The exceptions are a very few small ones, which are known as atonics. A few other small words known as enclitics have their accent usually upon the preceding word, with which they are closely connected. Only one syllable of a word is accented with an acute or circumflex. The acute can stand on one of the last three syllables; the circumflex on one of the last two. The other syllables of the word formerly had a grave accent, but one is not at present generally employed. It now only occurs in the last syllable. The acute accent inclines to the right, as in *ποιήσω*, the grave inclines to the left, as in *θὲόδὼρὸς*. In this the second, fifth and seventh letters have grave accents, while the third letter has an acute. From the acute and grave arose the circumflex (͂). Thus *ᾶ* came from *άὰ*, *ῶ* from *όὰ* and *ῆ* from *έὰ*. When the accented syllable has also a breathing the acute and grave are placed after the breathing and the circumflex above it, as in *ἥ, ὦ, ὃ*. When it is a capital they or any one of them are placed before it, as *Ἤ, Ὠ*. With a proper diphthong their place is over the second vowel, as *Οὔτε, Οὖν*. An improper diphthong is treated as a single vowel, taking its accents before the capital and over the vowel shown, as in *Ἅιδης = ᾅδης*. When a diæresis occurs the acute accent is between the two dots, while the circumflex stands above. The use of the diæresis is the same as in English, separating the second of two vowels from coalescing with the first. It will therefore be seen that a set of accents and breathings for Greek consists of acute, grave, circumflex and diæresis for all the vowels, seven in number, and the iota subscript for *ᾳ, ῃ* and *ῳ*; the rough and smooth breathings for *ρ*; the combination of two accents or of one accent and a breathing for each of the vowels, and a rough and smooth breathing, and acute, grave and circumflex accents to use before capital letters or in other places where they cannot be employed over them.

It should be noticed that the accent in the same word with the same meaning does not always remain the same. The acute accent changes into the grave under some circumstances. Accents are also used to mark a difference in meaning in a word, as in the French ou, or, and où, where. Thus *βίος*, life, is distinguished from *βιός*, bow; *δῆμος*, people, from *δημός*, fat. Certain vowels are cut off when the next word begins with a vowel, as *ἀπ᾽ ἄλλων* for *ἀπὸ ἄλλων*, an apostrophe being used at the end of the first word as the mark of elision. When two words, one ending and the other beginning with a vowel, are blended, as in our word wherever, the last letter of the first word is dropped, the succeeding vowel, with its mark, answering for the whole. This is known as coronis. Syllables end with a vowel and begin with a consonant, this forming the rule of division. When, therefore, a consonant stands between two vowels it is construed as belonging to the second. Thus the following divisions are correct: *πο-τα-μός, ὄ-ψο-μαι, ἔ-σχον, ἔ-βλα-ψα*. Compound words are divided according to the originals, as we divide horse-man and rail-road. When a consonant is doubled under certain circumstances the first consonant ends a syllable, and the other begins one. There are exceptions. Marks for quantity are used by grammarians and annotators, being the same that are used in all other languages of Europe. There are two signs, ˘ for short syllables and ¯ for long syllables. When employed in Greek the other marks which may be necessary are inserted before the vowel, but they are generally omitted. Capital lines used for headings or in titles frequently omit all accents, but sometimes have them preceding the character to which they refer and sometimes place them over the top. In the latter case they must be separately justified. Some letters are kerned, to give greater room for the face in one direction.

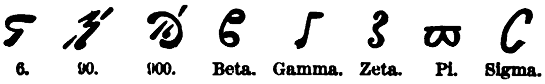
Theoretically, it would be an improvement to have the accents separate from the letters, as it would lessen the number of sorts required, but although this has been done it is difficult to compose them easily and justify them exactly. A neat accent should not have a body more than a quarter of that used for the text. Thus a pica would take a half nonpareil, or three points, and a brevier would require a two-point body, to which quadrats, spaces and accents should be made. A double set of characters is also required for the vowels in the text, one full body and the other cut away. These objections do not apply to great primer Greek and larger.

There are several characters which have two forms, as for theta *ϑ* and *θ*, and for sigma *σ* and *ς*. The latter is final, the former being used in the centre of words. Yet of late the *ς* has been employed in syllable endings, although in the centre of the word.

The letters which are much alike, or which are liable to be confounded one for another, are as follows: *Α*, alpha; *Δ*, delta, and *Λ*, lambda; *Η*, eta, and *Π*, pi; *Ζ*, zeta, and Σ, sigma; *Θ*, theta, and *Ο*, omicron; *Τ*, tau, and *Υ*, upsilon. In lower case they are: δ, delta, and ϑ, theta; ζ, zeta, and ξ xi; *μ*, mu, and *υ*, upsilon; *ν*, nu, and *υ*, upsilon; *ο*, omicron, and *σ*, sigma; and *ϖ*, one form of pi, and *ω*, omega. The letters which contrast much with English are: *Γ γ*, G; *Δ*, D; ζ, z; *Η η*, E; *Λ λ*, L; *μ*, m; *ν*, n; Ξ ξ, X; *Π π*, P; *Ρ ρ*, R; *Σ σ*, S; *Υ*, u; and *Ω ω*, o. The double letters are all unlike those in English, *Θ θ*, th; *Φ φ*, ph; *Χ χ*, ch; and *ψ*, ps.

In punctuation several characters are employed differently from the modern languages. The comma is alike; the colon or semicolon is a period upside down; the interrogation is a semicolon. The other points are alike. For greater relief to the eye and to show subdivisions in the paragraph some authors and annotators put a large blank, of three, four or five ems, where a new paragraph would be made in English.

The Greeks expressed their numbers by letters. The first eight letters stood for the units, with an additional character, which signifies 6, and is therefore ranged in the sixth place; the second rank consists of tens, and is formed of the eight succeeding letters, with an additional character, which signifies 90; the third rank consists of hundreds, and contains eight letters, with an additional character, which signifies 900, as here given. An accent under each letter in the fourth rank signifies a thousand, and the letter itself expresses the number of thousands which are meant. The letters of the first three ranks are marked with a mark on the top, like a bookkeeper's



PECULIAR CHARACTERS IN GREEK.

checking-mark, to distinguish them from the letters marked with a similar check below. By compounding the letters any number may be expressed; thus, *ι'α'* make 11; *κ'β'*, 22; *λ'γ'*, 33; *ρ'δ'*, 104; *͵αε'*, 1005. Some uncommon letters are also shown.

The Greeks sometimes employed capitals instead of the numbers of which they are the initial letters. Thus *I* was used for one, *Π* for five, *Δ* for ten, *H* for a hundred, *X* for a thousand and *M* for ten thousand. These letters may be repeated four times, except *Π*, as *II*, 2; *III*, 3; *IIII*, 4; *ΔΔ*, 20; *ΔΔΔ*, 30; *ΔΔΔΔ*, 40. So *ΔI*, 11; *ΔΔII*, 22; *ΠI*, 6; *ΔΠ*, 15. Sometimes these letters are inclosed in a panel, open at the bottom, as ⊓. This gives a power five times as great. Thus $\boxed{\Delta}$ is five times ten or 50, and $\boxed{X}$ is 5,000. *I*, or one, is never inclosed.

Inscription Greek is the earlier form of Greek, entirely in capitals, but of a different shape from that later used. The characters are:

Α	Alpha	Ν	Nu
Β	Beta	Ξ	Xi
Γ	Gamma	Ο	Omicron
Δ	Delta	Π	Pi
Є	Epsilon	Ρ	Rho
Ζ	Zeta	Σ	Sigma
Η	Eta	Τ	Tau
Θ	Theta	Υ	Upsilon
Ι	Iota	Φ	Phi
C	Kappa	Χ	Chi
Λ	Lambda	Ψ	Psi
Μ	Mu	ω	Omega

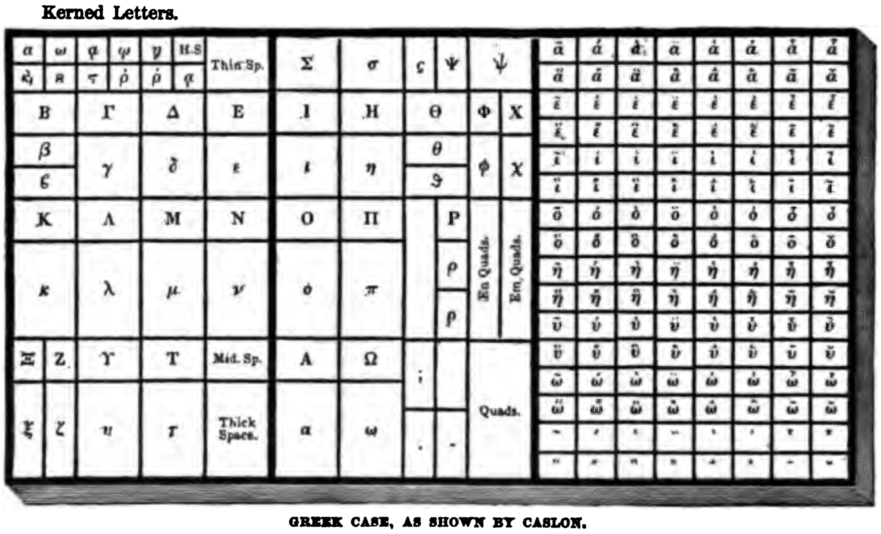
Proof-reading is mostly done by collating, as it is difficult to train a reading-boy to indicate all of the various letters, with their accents. Yet, when this can be accomplished, it is an advantage. In doing this the obvious English pronunciation is used, and not that of Greece, real or supposed. Thus the first words of the following sentence are read as follows:

ΠΑΤΕΡ ἡμῶν ὁ ἐν τοῖς οὐρανοῖς.—Pater (caps, space) hemōn (circumflex over o, space) ho (space) en (e lenis, space) tois (i circumflex, space) ouranois (lenis over u and circumflex over i).

For an ordinary sized office two fonts of Greek, brevier and small pica, will be enough. Large offices will need nonpareil, brevier, long primer and pica or small pica, besides a little large type for titles. It would be well to have all Greek type distributed by one man. When a large book, like a dictionary or a Bible commentary, is to be set largely in Greek, enough Greek must be on hand for two or three weeks' composition by the man or men employed upon it. There are very few editors who will return their last proofs on this kind of books with promptness. Greek type costs per pound about three times as much as English.

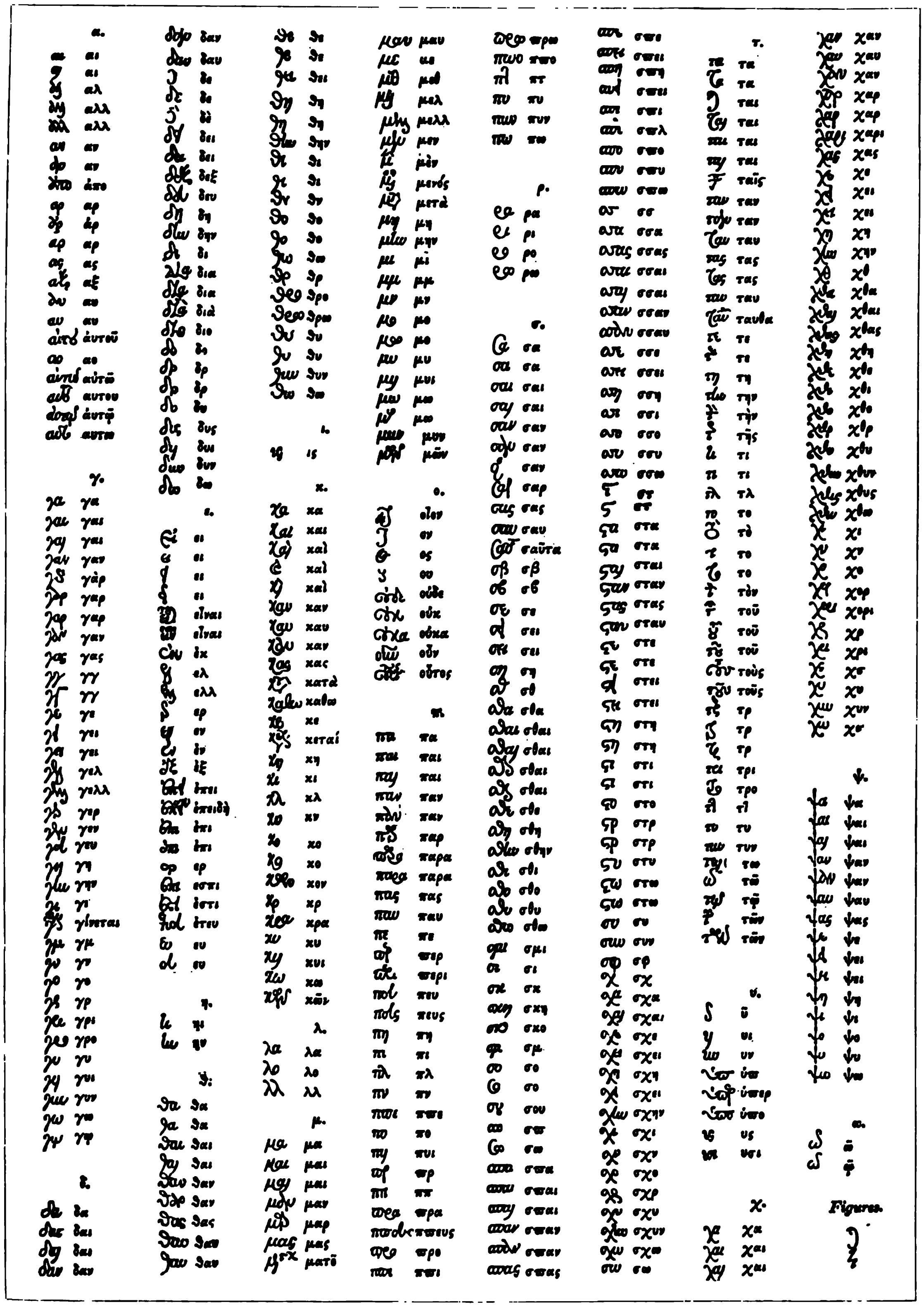
Greek type is cast by one foundry in New York, one in Philadelphia and one in Boston. Some kinds now in use in the United States have been imported from England and from Germany, the variety of faces in those countries being much larger than here, and the quantity of type of that kind set being much greater. Faces are cut from diamond to double pica, or larger. American founders will purchase foreign faces or matrixes, if desired. A heavy face, generally known as a Porson, is in use for headings and emphasis. Emphasis in grammars is sometimes given by thin spacing between the letters, and in Westcott & Hort's New Testament quotations are shown by the use of inscription Greek. Both of these methods, however, are exceptional. It is a question whether, in large books, it would not pay to have small capitals cut, as has been done in Germany, and for a temporary expedient underscoring the words with a brass rule would look well. This could be adopted in all job-work for colleges. It has not been approved by scholars for books.

A complete font of Greek, according to Caslon, the English type-founder, consists of one hundred and ninety-three characters. MacKellar gives one hundred and seventy-four. Diagrams according to each are shown. But in former years the case required many more sorts. Savage requires two hundred and two. When ligatures and abbreviations were in use seven hundred and fifty boxes were required for the different sorts. The inducement for the first founders of the art to perplex themselves with cutting and casting so many abbreviations and contractions was probably a desire to imitate Greek writing, and to produce in type the flourishes of the pen; but what could prompt them to confound themselves with an infinite number of ligatures cannot so well be accounted for, remarks Hansard. Savage has collected all of the abbreviations which have been currently in use in former times, and these are here reproduced. They were found necessary by him in superintending the reprinting of a book which had first been issued when contractions were in vogue. Until the beginning of this century contractions were common; they have now almost entirely ceased.



GREEK CASE, AS SHOWN BY CASLON.

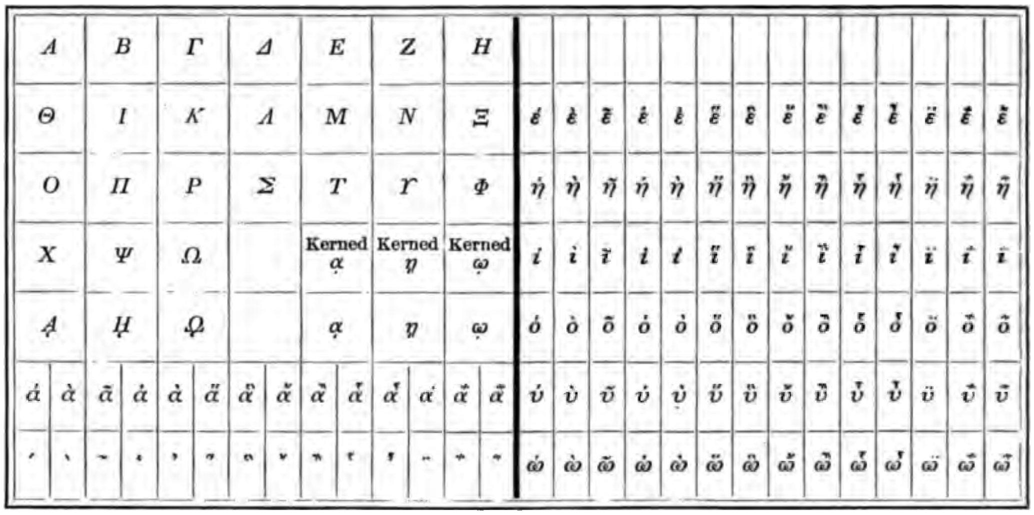
The proportion of letters in Greek varies much from that in English. The small *α* (a) in a font of one hundred thousand letters requires 4,050; *ν* (n), 4,000; *ε* (e), 8,750; *υ* (u), 3,750; *τ* (t), 3,500; *η* (e), 3,170; *ο* (o), 3,100;



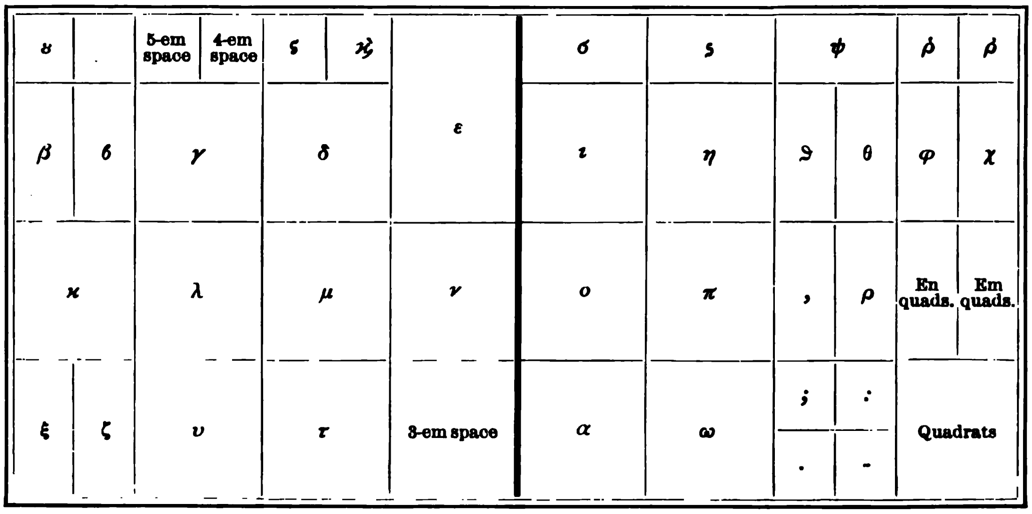
GREEK LIGATURES.

ι (i), 2,800; μ (m), 2,000; ς (s), 2,000; δ (d), 1,875; κ (k), 1,800; ρ (r), 1,750; π (p), 1,650; β (b), 1,800, and ω (o), 1,100. The least used lower-case letter is ψ (ps), of which there are 250. The capital most used is *I* (I), which requires 325.

The first printing in this language was in the Cicero de Officiis, by Fust and Schoeffer in 1465, at Mentz, The characters were exceedingly rude, and many of the letters were the same as used in other printing. The first book printed wholly in Greek was the Grammar of Lascaris, in Milan, eleven years later. The Aldine press afterwards produced many beautiful works, and from that time to this all printers whose class of business requires it have had on hand Greek type. In this country the chief employment is in text-books, but in Germany and England many works are brought out which are intended for the library of the scholar.



GREEK UPPER CASE, AS SHOWN BY MACKELLAR.



GREEK LOWER CASE, AS SHOWN BY MACKELLAR.

At the present day Greek is considerably used in newspapers in the East. Journals are published in Constantinople and Cairo in that language, and many are now issued in Greece. The language does not differ much from classic Greek, and is easily understood by those scholars who have been thoroughly educated and who have devoted a little attention to it. Athens is the chief publishing centre for both books and newspapers. A thriving university is situated there, and great attention is now paid to the former history and literature of the country. To some extent Greek is spoken throughout the whole eastern half of the Mediterranean.

Greek is not advantageously set in offices which do not make a business of it. Even if the compositor is a good classical scholar the case is rarely used, the quantity of type is small, sorts may be missing, and he lacks the familiarity which comes from constant employment. The rate laid down by De Vinne for charges to the customer is four cents a word, when occurring separately, not to be justified in; that is, when the Greek and the text are of the same sized letter, as long primer. When requiring justification, as small pica or brevier in long primer, six cents a word. For classical works, commentaries, &c., in which Greek words are profusely used, an advance per thousand ems should be asked, as follows, the words not being justified: For less than an average of five words to a thousand ems, the words to be counted. If the words average from five to seven, twenty cents a thousand ems extra; from eight to twelve, thirty cents extra; from thirteen to twenty, forty cents; more than twenty the words should be counted at two cents each. Common Greek is worth $1.50 on reprint and $1.75 on manuscript. In no case, however, should the price per thousand ems exceed $2. If the words are justified they should count as a word and a half each. These figures should be slightly abated now, as the price of bookwork was one-fifth higher when Mr. De Vinne wrote his Price List than it is at the present day. Tables in Greek take the extras, as in grammar, where paradigms are set in columns.

Greek Language.—The earliest of the languages of Europe which was reduced to writing and embodied much literature. The Greeks belong to the Indo-European race, and their language shows marked resemblance to all other tongues of that family. The early history of Greece is lost in the mists of antiquity. Tradition ascribes the introduction of writing to Cadmus, who went from Phœnicia to Thebes, and there is much resemblance between the Greek forms of the characters and those used in Palestine. Authentic history is generally supposed to begin at about the period of the first Olympiad, 776 B. C. Before this time Homer, or the poets usually known as Homer, had written the verse bearing his name, which is justly regarded as among the most important poetry in existence. Hesiod was the next writer. Afterwards a long list of poets distinguished by genius appeared, among whom may be mentioned Alcæus, Sappho, Anacreon, Pindar and Theocritus. The dramatists include Æschylus, Sophocles, Euripides, Aristophanes and Menander. The historians include Herodotus, Thucydides and Xenophon; the reasoners and moral writers, Socrates, Aristotle, Plato and Plutarch. The literature of the Greeks was abundant in very many other ways than those here mentioned, and was distinguished for its purity from florid ornament, the simplicity with which thoughts were expressed, and the cultivation of style. Except that of the Hebrews no other very early literature is remarkable for the perfection with which ideas are expressed. The value of the others is for the information contained. Alexandria became the principal seat of Grecian literature two centuries before the common era, but the language was largely spoken over the whole of the eastern half of the Mediterranean. After Rome became the principal city of the globe its citizens employed Greeks as teachers, and a knowledge of Greek was considered essential to well-educated Romans. When Christianity came commentaries on the Scriptures and explanations and defenses of them were written in Greek. We have at present none of the New Testament in Hebrew, although it is believed that one or more of the Gospels were written in that language. When Roman literature became debased Grecian literature declined with it in quality, although many ecclesiastical and historical writers continued their compilations. By the fifth and sixth centuries the older and more original authors were forgotten, and remained so, both in the Eastern and Western empires, until after the invention of printing. For eight or nine centuries little was produced by any writer which for itself alone was worth possessing. It might contain some fact or have in it something which would be valuable historically. The downfall of Constantinople in 1453 drove from that city a great number of persons skilled in the language, many of whom afterwards found employment with Aldus or with other printers in preparing books for the press. It was discovered in the forty or fifty years of search for manuscripts of early Greek authors which next followed that the majority of books written before the Christian era had perished, and that among the works lost were some of the most important ever written. Since that period a few more texts have been found, but it is believed, unless some of the books shall be contained in the libraries which may possibly be discovered in the cities now buried beneath lava and ashes on the Italian peninsula, that they are forever gone. It is to be noted that the language has never ceased to be spoken as a vernacular, and even at the present day does not differ widely from that used two thousand years ago. It is somewhat more simple, as all modern languages are. The early pronunciation is lost.

The Greek language is distinguished for its elaborate grammatical system. Distinctions in meaning are expressed by changes in the endings of words. In no other of the languages of Europe are the joinings or the articulations so beautifully clear or so consistent with each other. The study of this language is therefore regarded with great favor by grammarians, as more can thereby be learned respecting the mechanism of speech than by any other method. Taste and good judgment as a rule controlled the writings of the ancient Greeks, and their freshness and subdued tone afford excellent models for the students of to-day.

Greek can be learned by interlinear translation, by the study of grammars and by committing to heart long extracts, or by instruction orally through a native of Greece. Kendrick's Greek Ollendorff is a good work on that plan; Hadley's Greek Grammar has much reputation among those who study through grammar, and there are several well-known texts on the interlinear plan. The largest English and Greek dictionary is that of Liddell and Scott, which has been republished by Harper & Brothers, with many additions and changes. It is a quarto.

Greeley, Horace, who was entitled by Whittier "our later Franklin," the founder of the New York Tribune, was born of Scotch-Irish descent at Amherst, N. H., on February 3, 1811. He displayed great eagerness in the acquisition of knowledge, and when a small boy read every book that could be borrowed in his neighborhood. This love for books led him to become a printer, and in 1826 he entered as an apprentice the office of the Northern Spectator at East Poultney, Vt. He became an expert workman, and also took an active interest in politics. In June, 1830, his apprenticeship was suddenly terminated by the discontinuance of the Spectator. Shortly after he made a visit to his father, who had in the meantime removed to Western Pennsylvania, but after working a little in several offices in that neighborhood he determined to go to New York, walking the entire distance, more than three hundred miles. He reached that city in August, 1831, and after several unsuccessful attempts to find work at last obtained employment. In January, 1833, he began the printing business for himself in conjunction with Francis Story. They printed among other things the first penny daily ever issued. Its editor was Dr. Horatio D. Shepard, who began the enterprise with much faith, but little money, and that was exhausted in less than three weeks. After an existence of six months the partnership of Greeley & Story was dissolved by the death of Mr. Story, but the printing

HORACE GREELEY.

business was carried on by Greeley and two others. In 1834 they began the publication of the New Yorker, a Whig journal, which proved a success viewed from the editor's point of view. It gave long credits, however, and when it closed up, several years after, it was found impossible to collect the greater portion of the money due. Greeley was the editor, and it was charged with his views, varying much from those which it had been the habit to express in journals previously. Reform and humanitarian progress were the subjects of a very large part of its contents. In 1840 he edited the Log Cabin, a campaign paper devoted to the interests of Harrison. The Daily Tribune was begun on April 10, 1841, its capital being borrowed money, and the Weekly Tribune was first issued the next autumn. Success attended these efforts. The journal was enterprising, it had more and better election news than any other, and it well represented the views of a large party in politics, while devoting particular attention to moral questions. He was materially assisted in this by Thomas McElrath, a lawyer, but formerly a printer, who joined him, taking the business management, and who prevented shipwreck upon the same rocks which had injured Greeley's previous ventures. In 1850 the Tribune became a double sheet, and in 1854 it was enlarged to the size of the London Times. Great attention had been paid to the typographical appearance of the journal, and it developed a taste on the part of printers of newspapers which did not previously exist. In this office began the use of the compositor's slug, the phalanx and the present system of measuring. There also was begun the plan of inviting the workmen to join as part owners. Greeley & McElrath asked all who held a position of any responsibility to purchase one or more shares of stock and to become identified with the paper as proprietors, rather than as wage-earners, offering to lend them the money necessary. Many accepted. Greeley was elected a member of Congress for a portion of one term, lasting from December, 1849, until March, 1850, distinguishing himself by his advocacy of postal reform and his exposures of the evils of the mileage system. In 1851 he made a trip across the Atlantic, serving as one of the jurors at the world's fair in that year. After his return he published a book entitled Glances at Europe. Several years afterwards he again went over, when he was arrested and thrown into jail at Clichy, in France, on account of debts of the New York Crystal Palace, of which he was one of the directors. In 1859 he made a trip to the Pacific Coast, being warmly received. His paper had by this time acquired a remarkable influence. It was read by a very large number of persons with nearly the same certainty that its assertions were true as if they were contained in Holy Writ. All clergymen, reformers, teachers and believers in the development of mankind, as well as all who desired to put down evil by process of law, were its readers. It devoted much attention to agriculture, to temperance, and to the anti-slavery cause, and denounced everything evil. He was assaulted and injured by a congressman for strictures upon the South, which made him more popular still.

When the Civil War broke out he gave the government all of the assistance in his power, but his impatience at the slowness of McClellan's advance on the Peninsula induced him to pen some very harsh strictures upon the conduct of that campaign. During the war he was one of the most important civilians. After it closed he entered, in conjunction with Gerrit Smith, upon the bail bond of Jefferson Davis, then in prison, but not likely to be tried for years. This was an unpopular act, and lost him much of the respect of his party. The sales of a book he was writing stopped at once. After the election of General Grant as President he became dissatisfied with the conduct of the administration, many other Republicans sharing in this feeling. At first he limited himself to noting faults as he discovered them, but later denounced nearly all the acts of the administration. At the convention of the dissatisfied Republicans at Cincinnati in 1872 he was nominated for President, and the Democratic party in their convention also took him up. He entered into the canvass with much spirit, speaking with great ability almost every night. The contest was against him, however, and when the election took place he was in a great minority. There were not as many dissatisfied Republicans as he had believed, and many Democrats refused him their support. Towards the end of the campaign his wife was taken ill and died a few days after the election; the subscriptions and advertisements for the Tribune had fallen off very greatly, thus injuring the other stockholders, who were his warmest friends; the control of the newspaper had gone into new hands, and he was not allowed to express his sentiments freely; his exertions in speaking and writing, and in attendance at the bed of his wife, had been beyond his strength, and shortly after he developed indications of insanity. He was removed to a private insane asylum at Pleasantville, N. Y., and died there on November 29, 1872. His funeral was attended by the President of the United States, the Chief Justice, and as many distinguished men as ever came together on an occasion of this kind.

Greeley left two daughters and a very modest estate, considering the opportunities he had had for acquiring wealth. From a certain lack of ability to discriminate between those who were around him, he was much imposed upon, and gave a great deal of pecuniary aid to worthless schemes and worthless persons. As an editor he was the most powerful of his day, partly by the skill he possessed of stating facts so that they should be understood by every one, and partly from the influence he had acquired by his character. He represented the party of progress and reform—those who wished to make the world better—and he never stinted his efforts in this direction. He was a strong advocate of internal improvements and of a protective tariff. Singular in his appearance, from a certain carelessness and eccentricity in dress and an infantile expression of countenance, he was better known and more caricatured than almost any other American of that day. He spoke and lectured much, and was always present at political conventions of his party, where he exercised great influence. Besides the books mentioned he was the author of Hints Towards Reform, a History of the Struggle for Slavery Extension, an Overland Journey to San Francisco, Essays on Political Economy, What I Know of Farming, and the American Conflict. This was a history of the late war of considerable value. He wrote an interesting autobiography under the title of Recollections of a Busy Life. There are also lives of him by James Parton, L. U. Reavis and Lewis D. Ingersoll.

He took an active interest in the condition of workingmen, and in 1850 was elected the first president of the New York Typographical Union. After his death the members of the various printers' unions attempted to erect a monument of type metal in his memory, but this project was abandoned, and a bronze bust was designed by Calverley, which was erected in Greenwood. Most of the money was contributed by the employing printers of New York. A colossal bronze monument has been placed by the Tribune before its door, and the journeymen printers of New York have lately obtained sufficient money for another statue, which will be erected somewhere in that city.

Green.—A roller is said to be green when it is new.

Green.—This distinguished family of printers began with Samuel Green^1 of Cambridge, Mass., who was the second printer there. He had two sons who practiced the art in both Cambridge and Boston, Bartholomew^2 and Samuel^2. Timothy^3 was the son of Samuel^2, and grandson of Samuel^1. He removed to New London. Timothy Green^4 was the son of Timothy^3. In 1727 he was in partnership with Kneeland, going to New London and succeeding his father in 1752. Bartholomew Green^{3} was the son of Bartholomew Green^{2}. He was of the firm of Green, Bushell & Allen. Two of his sons were printers. Bartholomew^{4} never had a press of his own. John^{4} was the other. One of the daughters of Green was the mother of Joseph Dennie^{5}, the editor of the Portfolio, in Philadelphia, and commonly reputed to be the first person in America who sustained himself by his pen. All who preceded him had some other occupation by which they made a part at least of their subsistence. Jonas Green^{4} was the son of Timothy Green^{3}, who settled at New London in 1714. He printed in Boston a Grammar of the Hebrew Tongue, by Judah Monis. In 1740 he opened a printing-office in Maryland. John Green^{4} was the son of Bartholomew^{3}, of Green, Bushell & Allen. He began business with Joseph Russell in Boston. He was the last of that name who printed in Massachusetts. Three of the sons of Timothy^{3} of New London were printers. Samuel^{4} died in May, 1752, leaving three sons who were printers. Timothy^{4} was the partner of Kneeland, as has been related. Timothy^{5} was the nephew of the preceding Timothy^{4}, and son of Samuel^{4}. He set up a press in Norwich, but he remained chiefly in New London. He had two sons who were printers. One of these, Samuel^{6}, succeeded his father, and the other settled at Fredericksburg, Va. Samuel Green^{5} of New Haven was the third son of Samuel Green^{4} and grandson of Timothy Green^{3} of New London. He was taught printing by his uncle, Timothy^{4}. He was joined by his brother Thomas^{5} from Hartford in 1767. Samuel^{5} died in 1799. Thomas^{6}, a son of Thomas^{5}, succeeded him. Anne Catherine Green married Jonas Green^{4} of Maryland, and in 1767 succeeded him as printer. William Green^{5}, her son, became her partner. His brother, Frederick Green^{5}, some time after William's death, succeeded him and his mother.

Green, Bartholomew^{2}, a son of Samuel Green^{1}, was in partnership with his father at Cambridge for a few years. He removed to Boston in 1690, but was soon burned out, when he returned to Cambridge. In 1692 he went back to Boston. In April, 1704, he began the publication of the Boston News-Letter for John Campbell, postmaster. It was continued by Green and his successors until 1776. This was the first newspaper which was published continuously in America, although a single copy had been brought out several years before. Green printed for the college and also for the governor and council of Massachusetts. He was the most distinguished printer of his day, and did more business than any of the others. He was a pious and benevolent man. He died on December 28, 1732.

Green, Duff, Congressional printer, born in Georgia in 1780, attempted in 1834 to establish a printer's college or its equivalent in Washington. Boys were to enter it as students, and were to pay their expenses by labor in the government printing-office. It was an ill-considered scheme, and as it was immediately fought by every journeyman compositor the institute was not very long lived. He died in 1875.

Green, Samuel^{1}, the second printer at Cambridge, Mass., was a son of Bartholomew and Elizabeth Green, who were among the early settlers of that town. Samuel, then sixteen years of age, arrived with Governor Winthrop in 1630. What he followed in his early life is unknown. He began printing about 1649, when he must have been thirty-five years old. It appears from the records that there were in Cambridge in 1656 two presses, one brought over by Daye, and the other belonging to the Society for the Propagation of the Gospel. There were fourteen sizes and faces of types. The chief work done by him was printing the Bible in the Indian language. "It was a work of so much consequence," remarks Thomas, "as to arrest the attention of the nobility and gentry of England, as well as that of King Charles, to whom it was dedicated." A year's board of the workmen cost seventy-five dollars; fifty shillings sterling was charged for printing each sheet, a thousand impressions, and the paper cost a dollar and a half a ream. Of late these books have become scarce and high priced. The New Testament sold at the Brinley sale for $700, the Bible for $1,000. Mr. Green continued in business until about 1690, when, having become old, he retired. He was a captain of the militia company, and was for a long time town-clerk. He died in Cambridge on January 1, 1702, being then eighty-seven years of age. No printing was done in that town after his death, and the printing materials were removed and sold. He had nineteen children, eight by his first wife and eleven by his second. Several of these learned the trade of printer and carried on business. In Boston, in Connecticut and in Annapolis they were long settled. He discontinued business just before Bradford set up in New York, about seventeen years after printing had been begun in Boston, and seven after it had been begun in Philadelphia.

Green, Samuel^{2}, Jr., was the son by his first wife of Samuel Green^{1} of Cambridge. He was taught printing by his father, and printed in Boston in 1682, his being the third name in the annals of printing there, following Foster and Glen. He is represented as being an excellent man, and Dunton, the English bookseller, who visited Boston about this time, speaks of his wife as "a model from which to draw the picture of the best of wives." He died of smallpox in 1690.

Greenland.—A printing-press has been established in Greenland, dating from 1860. It is at Godhab, on the western coast. An illustrated paper with the name of Atnagagli-uti (the Literary Pastime) is published there by the Esquimaux, who themselves provide both literary matter and the illustrations.

Grève (Fr.).—Strike; grèviste, striker.

Griff (Ger.)—A handful (of type).

Gripper.—The fingers which grip or catch the sheet in a printing-machine.

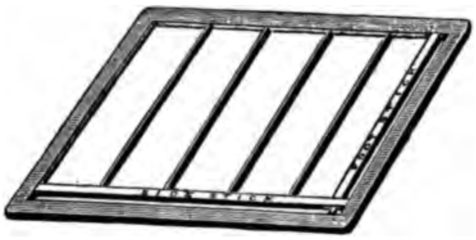
Gripper-Machines.—In England, machines which use fingers or grippers for laying on the sheets.

Grolier.—The eminent bibliophile, Jean Grolier de Servin, Vicomte d'Aiguisy, was born at Lyons, France, in 1479. He was descended from an Italian family, and during a residence in Italy became acquainted with Erasmus and Aldus. Louis XII. sent him to Milan as financial administrator. He was then ambassador at Rome, and upon his return to France in 1535 was made one of the four treasurers of the government, which he held through four reigns. He died in Paris October 22, 1565, aged eighty-six. The principal occupation of Grolier's life was the collection of fine books. He employed good printers, both in France and Italy, but it was upon binding that he left the greatest impress of his individuality. Many binders were employed by him, and from them he required their best. All of the bindings that still remain of his are of a very high degree of excellence, in many styles, and with much freedom, as well as exactness. See FINISHING. He was one of the first to introduce the style of lettering the book upon its back. None but the finest material was used by him. A common inscription upon his books was Grolierii et Amicorum, intimating that his books were intended for himself and his friends. At his death he left a library of more than three thousand volumes.

Grolier Club.—A club in New York city composed of lovers of well-bound and well-printed books. It started in January, 1884, at a meeting held at the house of Robert Hoe, Jr. Soon after it took rooms at No. 64 Madison avenue, and in 1888 moved into a house of its own at No. 29 East Thirty-second street. Originally there were only fifty members, but that number has increased to two hundred and fifty, with fifty non-resident members. Nearly all of the members are collectors or connoisseurs of books, and since its organization lectures have been repeatedly delivered upon subjects relating to their production, including among them De Vinne's Historic Printing Types, Matthews's Practical Bookbinding and Fraser's Two Hundred Years of Book Illustrating in America. Several very handsomely printed books have been published by the club, such as the Decree of Starre Chamber, Irving's Knickerbocker and the Philobiblon of Richard de Bury. The club bids fair in the future to do much to raise the standard of printing, illustrating and binding.

Groove.—1. The groove in the short bar of a chase to allow of the pointing of a sheet at press. 2. The hollow between the two posts at the bottom of each type. This groove is made by a little plow or grooving instrument.

Grooved Chase.—A chase made in such a way that very large forms can be lifted without danger of being pied. There is always a tendency to sagging in the centre of a large form. A grooved chase consists of a chase and sidesticks, with grooves in the inner side, and movable iron reglets, about a great primer in thickness, working in them. The grooves being continuous all around the inside of the chase and sidesticks, the iron reglets can be introduced into any portion of the matter, the same as ordinary reglets.



GROOVED CHASE.

Gros-Bâtarde.—An old face of type the same as SECRETARY, which see.

Grossa Nomperiglia (Ital., great nonpareil).—The largest size of type with a specific name known. In English, after reaching the magnitude of canon, all of the larger sizes are known as so many lines pica. They begin at four-line pica, which is next larger than canon. Grossa nomperiglia is eighty-six points on the Italian system, or ninety-three on the American. It is consequently equal to seven and a half lines of pica, or to six lines of pica, one of small pica and one of long primer.

Grosso Parangone (Ital., great Paragon).—Body twenty of the Italian series, which is as large as body twenty-one of the American series. It is nearly equivalent to double small pica. Gros Parangon is the Spanish equivalent.

Ground Blocks.—The blocks which are first printed when others are to follow; otherwise tint blocks.

Ground Tints.—The colors used for making tints, or the blocks from which these are printed.

Grub Street.—A street in London in which there was for many years a large number of poor authors, who produced compilations and books to order for a mere pittance. It was originally tenanted by those who manufactured bows and arrows and other things necessary in archery. Before the introduction of printing it was inhabited by text-writers and authors of A B C's. The name in the sense in which it has been used for the past two centuries is probably not older than the Restoration of Charles II. During the Commonwealth it was a kind of Alsatia, and its alley-ways, large, odd-shaped dwellings and peculiar inhabitants made it as safe a refuge for any one pursued either by individuals or the government as could well be found. For over a century this street continued to be the residence of small writers, index makers, copyists, poets who could not get their verses published, and translators. The pay was less for compilations than is now paid in London for copying on a typewriter. An author frequently subsisted a whole year on fifteen or twenty pounds. Among the most famous of those who were at one time residents of Grub street were Johnson, Goldsmith and Fox the martyrologist. Swift and other wits attacked the class who dwelt there, but the most severe assault was by Pope, in his Dunciad.

Guadagnare (Ital.).—To take in, as more matter in a paragraph.

Gualdrapear (Sp.).—To place the quires or folds of paper back and edge alternately, in wetting or packing.

Guarded.—Books are said to be guarded when the plates are mounted or sewn on guards instead of being stitched or pasted in the ordinary way.

Guards.—Strips of paper inserted in the backs of books for plates to be pasted on. This is done in order to prevent the book from being uneven when filled. The term is also applied to the cardboard or paper frames upon which prints are mounted.

Guarnacer (Sp.).—To garnish a page with a rule or border; to make ready the cylinder of a press with blankets, tympan-sheets, &c.

Guarnición (Sp.).—Furniture for imposition.

Guatemala.—The printing-press was not introduced into Guatemala until 1660. Some of the more southern provinces did not obtain presses till long after the war of independence. A monthly periodical, the Gaceta, was started in Guatemala in 1729, and, in spite of many suspensions, managed to pass into the present century, and subsequently sustained itself as a weekly, being generally adopted as the official organ. In 1797 a weekly paper was launched in connection with a politico-economical society; in 1820 two journals appeared, and after this new ones sprung up almost every year, although few survived. Most of the newspapers now published in Central America are political organs; the news is stale, but there are occasionally scientific articles and installments of translated novels. The most important books that have been published are the two histories of Guatemala, written respectively by Fuentes y Guzman and Domingo Juarros; both of these works belong to colonial times.—*Mayo W. Hazeltine.*

Guernire (Ital.).—To surround a page with its necessary furniture.

Guernitura (Ital.).—Furniture.

Guide.—A piece of reglet or a lead, hung by a string over the capital case, beneath which the copy is placed. As it is set the guide is moved down to cover up the part which is finished and to afford an indication to the compositor as to how far he has set. Most compositors in the United States do not use one, but on the continent of Europe it seems almost indispensable. Very elaborate guides are shown in several books. Southward tells the compositor not to use a guide to indicate the place in the copy at which he is working. A guide is in reality a drawback rather than an aid.

Guides.—The groove in which the plow moves upon the face of the cutting-press.

Guillemets (Fr.).—Quotation marks. They differ in form from those used in English and German, their shape being « ».

Guillotina or **Cortador Poligono** (Sp.).—Upright mitering-machine.

Guillotine.—A term used for a cutting-machine in England.

Guinea Edge.—In bookbinding, a roll with a pattern similar to the edge of an old guinea.

Gull.—In England, if points are blunt or thick and tear the point-hole on the sheet they are said to be gulled.

Gummed Paper.—Paper in various colors or sizes ready gummed.

Gums.—Certain natural vegetable exudations which soften or dissolve in water, and yield a more or less perfect mucilage. Properly speaking they are insoluble in spirits. Gum resins are imperfectly soluble in both water and spirits, and resins are insoluble in water, but perfectly soluble in spirits. Gum is only found in commerce in the solid state. Gum arabic, gum hogg and gum tragacanth are those most commonly used in printing and bookbinding, starch, flour, dextrine and other substances which form pastes being used where cheapness is essential.

Gun Metal.—Frequently used in England for composing-sticks. It is composed of eight or ten parts of tin to one hundred of copper.

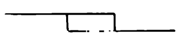
Guss (Ger.).—A font, a casting.

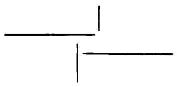
Gutenberg, John, inventor of printing, was born about the year 1399 in the city of Mentz, Germany, at that time the leading town in the Rhine confederation, and having a population of nearly one hundred thousand. His father, Friclo Gensfleisch, and his mother, Else Gutenberg, came of good families, and were in easy circumstances, possessing three residences in different neighborhoods and having other property. The son probably took the mother's name so that it should not become extinct. Occasionally, however, he was known as Gensfleisch, and so appears in documents. Civil disturbances occasioned the removal of the family to Strasbourg, where he was mentioned by name in a proclamation. In 1432 he visited Mentz. In 1434 he caused the arrest of the town-clerk of Mentz, who was then on a visit to Strasbourg, on the ground that the city of his birth owed him a sum of money. Relenting, however, he consented to the official's return. In 1436 he appeared as defendant in a suit for breach of promise of marriage with Anne zur Isernen Thur (Anne of the Iron Gate or Door). The conclusion of the suit is not known, but it is generally believed that Gutenberg married the plaintiff. In 1439 he was once more a defendant in a lawsuit, brought against him by George Dritzehen, a citizen of Strasbourg.

Very little is known of any of the events of Gutenberg's life before the trial of this suit. When the case was brought up Dritzehen declared that he appeared on account of a partnership which had existed between Andrew Dritzehen, his brother, lately deceased, and Gutenberg, which had been profitable. George and Claus Dritzehen, a third brother, were the natural heirs of Andrew, and had asked Gutenberg to take them into the partnership in the stead of Andrew, which he refused, although the brothers were willing to assume the liabilities which Andrew had contracted on account of lead and other materials. In answer Gutenberg said that this complaint seemed to him very unjust, as the surviving Dritzehens could easily learn the nature of the agreement which had existed between their brother and himself. Andrew Dritzehen had come to him many years before and asked him to teach him certain secrets; it was for this reason and to comply with his request that he had taught him how to polish stones, from which Andrew had derived a good profit. Gutenberg also stated that other secrets which had been communicated to Hans Riffe and Anthony Heilmann were disclosed to Andrew Dritzehen at his solicitation. These secrets were relating to something by which money could be made, and Dritzehen was made a partner. He had never paid completely for his share, but died in debt to Gutenberg. It is plain that the partnership was not of the nature of a trade in commodities. It was a manufacturing partnership covering three articles. The first work was polishing stones, by which, the Dritzehens said, their brother had made a profit. The second was making mirrors, as appeared by the evidence of one of the witnesses. The third was a secret and had cost much money. Dritzehen had worked night and day upon it; he had spent a great deal of money, and at the time of his death the article to be manufactured was not in a merchantable condition. Gutenberg had made a discovery, which had been explained to his partner, and which had so impressed Andrew with its value and practicability that he had risked his "goods and his inheritance."

The witnesses did not make it clear what this invention was, and although the Dritzehens must have known they likewise refrained from probing the matter. They probably hoped that the order of the court would put them in possession of a share of the business and with it the secret. As soon as Andrew died Gutenberg sent his personal servant to the place where the work was being prosecuted, where four pieces were lying in a press, to take them away and separate them. These were held together by two buttons. When detached no one could tell what they were for. A press had been made for them by a carpenter, and a jeweler had been for a long time engaged in "doing work connected with printing." It was also proved that the "forms," whatever they might be, were melted before Gutenberg's eyes.

An examination of this testimony will show that in 1439 Gutenberg was a man with a reputation for mechanical ability, and that he had the faculty of persuading others to help him. Hans Riffe, then the mayor of Lichtenau, Andrew Heilmann and Andrew Dritzehen had each asked to be taken into partnership, and after Andrew's death George and Claus Dritzehen had likewise sought to be associated with him. The latter must have known that so far the business last entered into had been unsuccessful, as their brother had spent all of his money, but in spite of the loss he had not desired to withdraw. Neither had Riffe nor Heilmann. It was a very expensive experiment that these men were prosecuting, and there was little to show for the money. The making of punches, matrixes and casting apparatus answers to these conditions. The cost is very great in proportion to size. There were a press, forms which could be melted, and the labor of a jeweler. The latter would probably be employed in making the punches, the forms would be some types which had been cast or their matrixes, and the press was for trial of the results. No printing had been done, for there is no mention of paper and ink, and the quantity of either that might be needed for experiment was very small. Various explanations have been made of the four pieces connected and fastened by a button. Of late it has been generally believed that it was a type mold. These are not now in four pieces, but were once so made for the convenience of casting two or three sizes of type with one implement. As made to-day they slide only one way, so that, while they adapt themselves to differences in the thickness of letters, they are only available for one size, up or down. In the early ages it was probably necessary to have adjustable molds, and perhaps the inventor was unable at once to discover how he could make the apparatus so that it could be available otherwise. Whatever this tool might have been, however, it is believed by most inquirers that the art began in Strasbourg, and they point to the fact that earlier than any other place it took up the labors begun in Mentz. The first book printed which we know about showed an experience which must be denied to novices. Between 1439 and 1455 this knowledge could have been acquired, but not in two or three years.

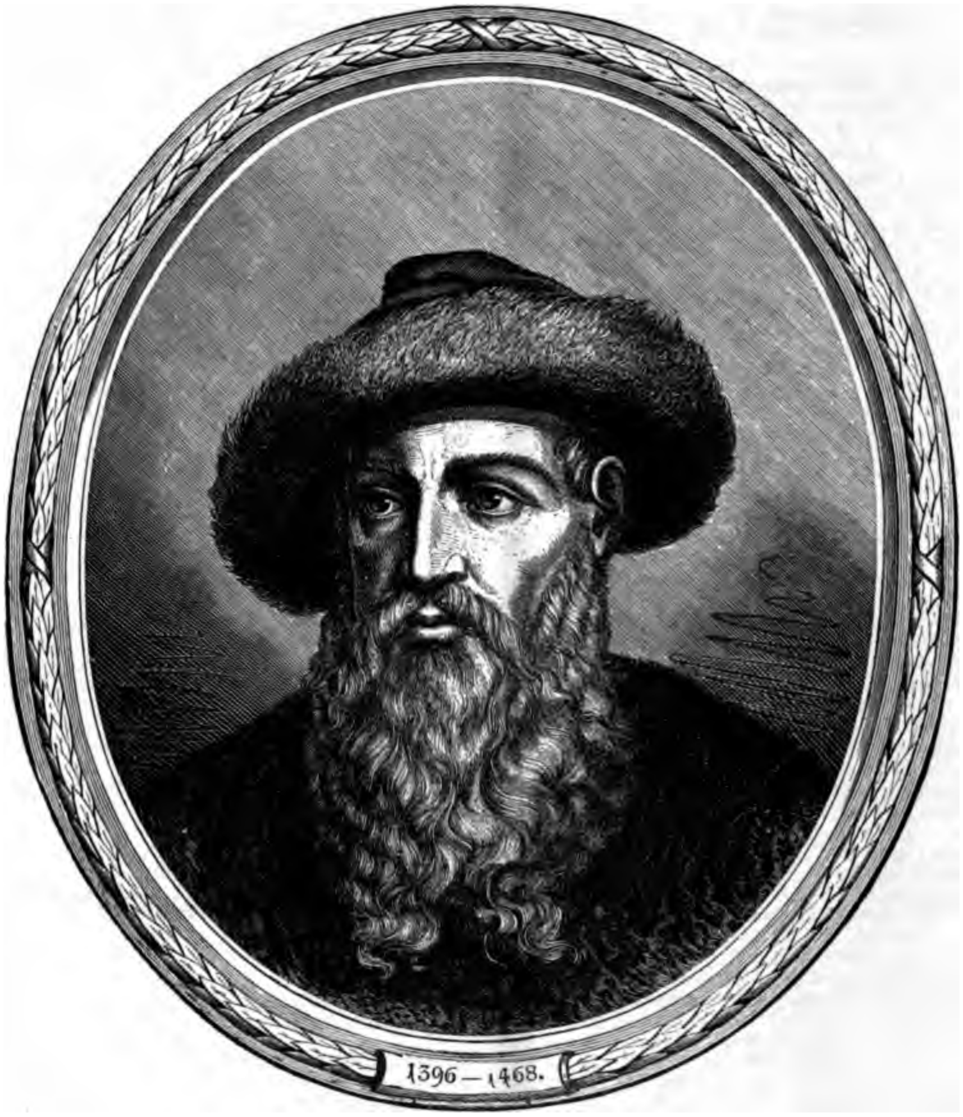

PRESENT ADJUSTMENT OF MOLD.


FORMER ADJUSTMENT OF MOLD.

The last years of Gutenberg's experiments in Strasbourg were productive of no results that we can now see. He remained in debt, and sold all of his property in succession to sustain himself. At last he returned to Mentz. On October 6, 1448, he appears as a borrower of money in that city. He must have begun work immediately, for part of a Donatus has been discovered near Mentz in the original binding of an old account-book of 1451. It is from the types of the Bible of thirty-six lines, and in one place the letter i is reversed, a positive proof that it is typographically printed and is not from a block-book. It is probable that many other little books were issued before the great Bible came out, for Gutenberg could not have continued borrowing money, year after year, without showing results, and it was easier and cheaper to experiment on actual books than on things which were to be thrown away when printed. Besides this fragment the earliest productions of the press are some Letters of Indulgence, issued in 1454 or 1455. The wording is substantially the same, but they are distinguished from each other by the number of lines, one having thirty-one, one thirty-two and one thirty. Each has two sizes of type, varying from a type smaller than English up to double pica. Those of the last magnitude are the types of the Donatus of 1451 and the Bible of thirty-six lines; those on the paragon body are the types of the forty-two-line Bible. The small types, so far as we know, were never used elsewhere.

To carry on this work Gutenberg was obliged to resort to the money-lenders. He had no means of his own, and to bring his invention to a successful point he had recourse to Johann or John Fust, a goldsmith of that city and a man of means. The story of this agreement is narrated under the head of FUST. Gutenberg no doubt promised a speedy return of the money invested, which he was prevented by circumstances from doing, as many other inventors have been prevented; the agreement was loosely drawn on his side, and Fust took advantage of its terms.

The great work promised was at last completed. It is the general opinion of the learned that the forty-two-line



JOHN GUTENBERG.

commonly known as the Mazarin, from its hav-
en discovered in the library of the cardinal of that
is the earliest book issued from the press, but many
uding several of the most acute bibliographers—
in that the Bible of thirty-six lines is entitled to
onor. It is thus called because there are so many
n a column. The latter is in double-pica body, and
lly bound in three volumes ; the former in paragon
sually in two volumes. The number of copies of
azarin Bible still in existence is over twenty, seven
upon vellum. It is on a large page, with wide
ns, and large spaces were left in the text for the
initial letters which were to be painted in. The
have very black faces. The body marks are full,
cenders and descenders go little further than the
and square letters, the hair-lines are heavy, the dis-
between one letter and the next is very small, and
ole effect is of extreme blackness. Double letters
bbreviations were liberally used. The register is

The ink is black and clear in most copies, but on
s grayish. Red lines were printed in places. There
arked differences in color in different parts. The
book was of 1,282 printed pages, without the sum-
of contents, and was generally printed in sections
leaves, or five double leaves nested in together.
line is full. There are no blanks and no white
for a relief to the eye. The whole appearance of
ok is imposing, although judged according to our
n standards it is not legible.

believed that this book was finished in 1455, though
is no exact proof of this. One illuminator added
copy the following colophons :

t Volume.—Here endeth the First Part of the Old
nent of the Holy Bible, which was illuminated,
ated, and bound by Henry Albech, or Cremer, on
Bartholomew's Day (August 24), in the year of our
1456. Thanks be to God. Hallelujah.

nd Volume.—This Book was illuminated, bound,
erfected by Henry Cremer, vicar of the Collegiate
h of Saint Stephen in Mentz, on the Feast of the
ption of the Blessed Virgin (August 15), in the year
Lord 1456. Thanks be to God. Hallelujah.

ound copies were sold at different times and places
ices varying from twelve guilders to sixty crowns.
n twenty-five years a copy on vellum has sold for
0, and on paper for $13,500. Gutenberg's name
ot attached to it, and the publication was anony-
for he had been ousted from the office created by
orts. On November 6, 1455, Fust demanded pay-
for his bond. Had business been good Fust would
bly have been satisfied with having Gutenberg con-
in the partnership, as if he had once made money
em he would probably do so again. The inventor
nprepared for so hasty an action by Fust, and did
mself appear in court, sending his workmen. He
defense to offer and felt that an appearance would
less. The verdict was in Fust's favor, and all of
aterial created since the partnership passed into
nds.

enberg was at this time nearly sixty years of age,
did not sit down quietly after his types were taken
him. He had been able to devise the implements
first place ; he had had sixteen or more years of ex-
ce in their use, and he determined to found a new

Conrad Humery, the clerk of the town of Mentz,
as also a physician, provided him with the means.
mortgage did not cover all of the materials used
common stock ; it did not embrace the large types
uble-pica body, and probably not some other ma-
. Work must have been begun immediately in the
lace, for with the face just named he printed a cal-
for 1457. In 1461 he printed a Letter of Indulgence
new type. In 1460 he published a Catholicon, a
f 748 pages, in double column, which contained a
grammar and dictionary. Several pamphlets have
een attributed to Gutenberg.

A book which has generally been believed to be from his press, but which has no proof within itself of the truth of the assertion or the time when it was issued, is the Bible of thirty-six lines. It is a large demy folio of 1,764 pages. The register of the first section is defective ; the spacing is bad, and the whole shows inexperience. Later sections are much better printed. Some of the characters were used in the Indulgence of thirty-one lines and in the Donatus of 1451. It is therefore believed by some that this Bible preceded the other, the type being ready. Another evidence relied upon to show that this book was the first is a statement of Ulrich Zell, a very early printer. He says in the Cologne Chronicle of 1499 : "In the year of our Lord 1450 they began to print, and the first book they printed was the Bible in Latin ; it was printed in a large letter, resembling the letter with which at present missals are printed." This is the only early Bible to which this statement will apply. The types were new. Types cast from the same matrixes frequently appear in other works, some with definite dates, but they are always worn.

Whatever business Gutenberg had built up, however, by 1460 or 1461 was destroyed by the events of 1462. In 1461 Diether, Count of Isenburg, was the archbishop and elector of the city. Another prelate, Adolph II., Count of Nassau, claimed the archbishopric and made war upon the town, which supported Diether. On the night of October 27 and 28, 1462, the town was assaulted and taken by the followers of Adolph. Its noblest citizens were murdered and the place was sacked. All industry was destroyed. By this calamity Fust and Schoeffer's office was probably destroyed, and it is certain that the workmen were spread abroad. Gutenberg may have received no damage to his type, as it is not certain that the characters were within the fortifications, but his business was stopped. For three years nothing of value was printed in Mentz by either printing-office. In 1466 that which contained Gutenberg's types was in active operation at Eltville, a village near by, and where Gutenberg's mother was born. Adolph had selected it for his residence, and in 1465 he made Gutenberg one of the gentlemen of the court, "for agreeable and voluntary service rendered to us and our bishopric." What these services were is not known. His office passed into the hands of Henry and Nicholas Bechtermüntz, relatives of his by marriage. Gutenberg printed no more. His labors in that capacity were ended. The art was then practiced by many, and would soon be familiar to hundreds, each year showing greater results and improved procedures. In 1467 the Eltville office produced a Vocabulary, in 330 quarto pages, with the types of the Catholicon.

Gutenberg died before February, 1468. Nothing is known of the circumstances. Conrad Humery shortly after agreed that Gutenberg's types and instruments should never be used except in the city of Mentz. They remained with Nicholas Bechtermüntz until his death, then going into the possession of the Brothers of the Life in Common, at Marienthal. In 1508 they were sold to Frederic Hauman of Nuremberg, who established a printing-office in Mentz and used these types in many of his books. Here they remained at the end of the sixteenth century.

Almost all of the statements contained above have been denied by some writers, and a very large school denies that there is anything definitely known about Gutenberg except that he was a printer of Mentz, and that he was the defendant in a suit brought by John Fust against him in 1455. The story of his trial for breach of promise is declared to be a forgery, as well as the proceedings in the Dritzehen case in Strasbourg. Van der Linde, a Dutchman, who examined the Koster legend with acuteness and local knowledge, completely demolished it, and incidentally placed Gutenberg in a much stronger position than he had occupied before. He also disputed the claims of Fust and Schoeffer to an equality in the invention, and showed that the chief merit must have belonged to Gutenberg. Thus with Koster dismissed as a myth, and Schoeffer and Fust placed far behind, an increased importance attached to the remaining one of the four to whom the invention is commonly ascribed. Hessels, another Dutchman, possessed of greater knowledge of printing, bibliography and the appearance of early type than Van der Linde, but with less skill as a reasoner or a dialectician, began the investigation anew shortly after. He found some of Van der Linde's assertions unsupported by authority, as he had often taken quotations without verifying them. In consequence he had frequently fallen into error. Neither were all of the documents relating to Gutenberg such as would stand scrutiny. As a result Hessels produced a book in which he attempted to destroy the Gutenberg myth, as he claimed it to be, and certainly produced a revulsion in favor of an early Dutch origin to the art, as many type-printed leaflets and small books have been found in Holland within the last thirty or forty years which bear no resemblance to the books of the Dutch printers at the time when typography was known to be practiced there. Where did these little books come from and where were they printed? Their rough appearance, he asserted, indicated that they could not have been copied from the productions at Mentz. For these reasons many, including the late William Blades, maintained that there probably was a double invention of the art; one, in a rude and unskillful form, in Holland, and another, much more perfect, in Germany. The contest is still going on.

The claims of Gutenberg to be considered the inventor of printing may thus be briefly summarized, throwing aside the documents which some have declared doubtful:

There was some printer in Mentz as early as 1451, as is shown by an account-book of that date, in which a part of a Donatus containing a reversed i is to be found. In 1454 or 1455 three Letters of Indulgence were issued there, one of them in the types used in the 1451 Donatus, and later in the Bible of thirty-six lines. Whoever printed the last printed the first. In 1455 an almanac was printed, again in the same type. Until this time the printer was unknown, but in the next year it was shown who he was, as he was sued by Fust, his partner, for nonfulfillment of a contract begun in August, 1450. The record of the trial proves that John Gutenberg was the anonymous printer. Fust did none of the work, as he was expressly exempted from it by the terms of the partnership. He was, besides, a money-lender and a goldsmith, and presumably had interests in many different directions. Gutenberg was thrust out on November 6, 1455; on August 24 ensuing the great Bible was bound which had just been produced. It would have been impossible for any printing-office at the dawn of the art to have sent forth a book as great as this, containing three millions of ems, and going on the press more than six hundred times, in ten months. It must have been partly, if not wholly, produced during the existence of the partnership.

Fust would most certainly have refused to lend any money to Gutenberg or to enter into partnership with him unless he had expected to get his money back. In August, 1450, he was convinced by Gutenberg that he
had a new and valuable invention; that there was
in it, and that it would be for the advantage of bc
Gutenberg to begin work at once. Fust was to
work; Schoeffer was the year before a student in
and was only twenty-one years of age. After the
between the two men was broken Gutenberg wa
in a very short time to begin again, and produced
from time to time until his death in 1468. Dr. Hu
the possessor of his printing-office, then agreed
Gutenberg's tools in use only in the city of Ment:
pointing out that he regarded them as sacred reli

On October 3, 1458, Charles VII. of France, l
learned that Messire Guthemburg, chevalier, a ma
trous in engraving and in type and punches, ha
fected the mystery, sent one of the officers of hi
to obtain information about the "said form and
tion, there to hear, to consider and to learn th
Nicholas Jensen was selected. In 1468 Peter Sch
who had been Fust's partner after Gutenberg, de
that "He who is pleased to endow mighty me
knowledge has given us two distinguished mas
the art of engraving, both bearing the name of
both living in the city of Mentz, and both illustri
the first printers of books." In 1505 John Schoe
grandson of Peter, in the dedication of a book said
was "printed in Mentz, the city in which the adn
art of typography was invented, in the year 1450,
ingenious John Gutenberg, and afterwards perfe
the cost and by the work of John Fust and Peter S
fer." About 1514 Trithemius related a conve
which he had had some thirty years before with
Schoeffer himself. Schoeffer declared that the a
invented in Mentz, being planned by John Gutenl
citizen of that town. "When he had spent all his
erty in his search after this art, and was almost
whelmed with difficulties, unable to find relief fro
quarter, and meditating the abandonment of his p
Gutenberg was enabled by the counsel and by the
of John Fust, also a citizen of Mentz, to finish the
which he had begun."

Concurrent testimony is borne by many other pe
Matthias Palmer in 1474, Polydore Virgil in 1517,
feling in 1499, two professors at Heidelberg in 14
Philip de Lignamine, in 1474, each bear witness to
berg. A multitude of writers assert that the begi
of the art was at Mentz, among others being Va
at Cologne in 1478, Caxton at Westminster in 14
Archbishop Berthold of Mentz in 1486, and Meyde
of Mentz in 1494. A monument and a tablet we
erected to the memory of Gutenberg, one shortl
his death and the other in 1508.

Gutter.—The space between those two adj
pages whose folios added together make one mor
the number of pages in the form, supposing th
lowest page began with 1. Thus in a sixteen-pag
the 2 and 15, the 6 and 11. It is the narrowest
between pages in the form.

Gutter Sticks.—The pieces of metal or fur
used to separate pages which are side by side.

Gypsum.—See PLASTER-OF-PARIS.

H

H THE eighth letter in English. It is one of the letters which are much used, and yet it falls a little short of those most required. On Roman coins and inscriptions and in manuscripts H has a diversity of meanings, such as honestas, hic, homo, habet, hora, honos, Hadrianus, &c. In the Latin of the Middle Ages H meant 200, and with a dash over it 200,000. H forms the standard for letter-cutters in designing capitals. After the lower-case m is made, by which the bottom of the non-descending letters is determined, the H, beginning at the same lower line, ascends until it reaches the height for which this character is designed, and bottom and top then form the gauges for all other capitals. The shape is undoubtedly borrowed from the Greek Eta, or long e.

Haarlem.—A city in Holland, in the province of North Holland, famous as one of the three towns in which the art of printing is said to have been discovered. It is on the river Spaarne, three miles from the sea, ten miles from Amsterdam and seventeen from Leyden. It now has a population of about thirty thousand. In the centre of the city is a bronze statue in honor of Koster, whom the Dutch regard as the inventor of printing. At present there are a number of printing-offices there, as well as a famous type-foundry.

Haarstrich (Ger.).—The fine line of a letter.

Hagar, William, a type-founder of New York, who was born in Rutland, Vt., in 1798. He was first apprenticed to a watchmaker, but in 1816 went to New York, where he entered the employ of Elihu White. He proved a skillful workman, and in 1833 became a partner. When the firm was reconstructed shortly after the death of Mr. White he withdrew, but by himself and later in partnership with others continued business until his death in December, 1863. He was at one time the owner of Bruce's type-casting machine, and introduced it into many foreign countries. The business was subsequently conducted by his sons as Hagar & Co. They were, however, unfortunate, and their place was closed, the tools and materials being purchased by the three other New York type-foundries jointly. Lately the matrixes and punches were broken up.

Hailing, Thomas, an English printer of the present day, who was born at Gloucester, England, on October 8, 1830. He became an apprentice to his grandfather at Cheltenham. In 1852 he took charge of the private printing-office of William J. Linton, the famous wood-engraver. This was closed in 1854. About 1857 he returned to Cheltenham, where he had inherited his grandfather's office, and the business soon quadrupled. He was the first who began the publication of a specimen exchange; in 1877 he issued a trade journal, called Hailing's Circular, and in 1879 he published a volume of Specimens of Printing. His was the first establishment in England in which American type was used.

Hair Leads.—Very thin leads are thus called in England.

Hair-Line.—Any kind of character in which the thick and thin lines are alike destitute of much thickness. The lines are finer than in skeletons. This is also said of the fine lines in letters. They gradually increase in thickness as the size of the character grows larger.

This is a Hair-Line Letter.

Hair Spaces.—Very thin spaces, sometimes six to an em, but they are more generally seven or eight. On large sizes of book type, ranging from pica to double small pica, it would not be difficult to obtain them of ten or twelve to the em. Beyond these sizes a lead makes a good hair space. Occasionally a card or a sheet of hard paper is cut to make hair spaces for small sizes of type where they become necessary, as will sometimes happen between letters, in order to set one off from another. Headings are sometimes hair spaced, but it is most usual to put five-em spaces in such places where separation is needed at all. In some offices in New York the experiment has lately been tried of adding six-em spaces to the ordinary thick space, where the line needs to be spaced out, thus obviating the necessity of taking out the thick space and inserting an en quadrat. It is said to work well. Hair spaces should never be used in place of five-em or other spaces, except in cases of the most extreme necessity, which will not happen to a man on regular bookwork half a dozen times in a year. They should be reserved for corrections on the press and for job-work. They are very liable to be lost or become short after being used for a little time, so that an office which permits their use must expect to renew them very frequently.

Halbfette (Ger.).—A heavy-faced type somewhat condensed. "Fette" is full-face; "halbfette" would be nearly full-faced condensed.

Halbgevierte (Ger.).—En quadrats.

Half Binding.—Half roan, half calf, half morocco, half russia mean that the back and corners of a book are covered with the leather or material mentioned, the sides being covered with cloth or marbled paper; whereas quarter binding means leather back only and not corners.—*Caspar.*

Half Case.—A case one-half of the usual length.

Half Chase.—One of two chases which are worked together, being thin where they meet, and frequently having projecting points in the one to fit into hollows in the other, so that they must register exactly with each other.

Half Frame.—In England, a single stand, or stand to accommodate one compositor only.

Half Large Cards.—A size of card in England, 3 by 2¼ inches.

Half-Plate Paper.—Machine-made paper of fine and soft texture used for wood-cuts.—*Jacobi.*

Half Press.—When only one person works at the press. He consequently must beat or roll as well as pull. Obsolete.

Half Sheet.—Bookwork in America is now generally printed in half-sheet fashion. When thus printed there are two copies on one sheet, as the sheet works and turns. If, for instance, there are sixteen pages on a sheet of a book the common method is to impose it so that all of the pages shall be in a single form. Then, when the requisite number have been printed on one side the sheet is turned over and the back is worked. The register is more certain, mistakes in imposition are more quickly ascertained, and the work proceeds more smoothly.

Half Tints.—A term applied to those parts of an illustration which are of partial depth.

Half Tone.—That class of process engraving in which the requisite lines in relief are given by means of a screen, through which the light passes. Nature forms a photographic picture in many insensible gradations, the surface being entirely flat. If a photograph on metal, mounted of the proper height, were to be placed on a printing-press the subsequent impression would be entirely black. It is necessary to break up this surface and to have prominences and depressions. This is given by the screen. There are also other methods, which will be described under PROCESS PRINTING. The engravings made by the half-tone methods are peculiarly soft and agreeable, but are apt to be indefinite.

Half Work or **Half Time.**—He that works but three days in the week does but half work.—*Moxon.* Half time is at the present day usually extended through the week, labor being done in the morning or afternoon of each day. On newspapers men are sometimes given a furlough. This is when too many men are employed, and a certain number are laid off each day.

Hall, David, a partner of Franklin, was born in Scotland and brought up as a printer in Edinburgh. He was employed by William Strahan in London, and went to Philadelphia on his recommendation in 1744. The next year he formed a partnership with Franklin, which lasted eighteen years. After this had ended he formed another with William Sellers, as Hall & Sellers. Their business was lucrative; they printed for the government and continued the Pennsylvania Gazette. Besides printing, Hall carried on a stationery and bookselling business. He died on December 24, 1772.

Hall, Francis, for many years publisher of the Commercial Advertiser of New York, died in New York on August 11, 1866, aged eighty-two years. He was born in England, but came to America as a boy, learning the printing business after arrival. He entered the office of the Commercial Advertiser in 1811, in 1813 became part owner, but later sole owner, and continued thus until 1864. He was much esteemed.

Hallenbeck, John Johnson, a printer of New York, was born in the city of Albany in the year 1820. He served his time partly with E. & E. Hosford and partly with other printers. In 1836 he went to New York, and was there first employed by John F. Trow, who was then in Ann street, and afterwards was engaged at other houses. In 1842 he went into the office of Harper & Brothers, and in 1846 became foreman of their pressroom. In this position he displayed great abilities as a manager. In 1856 he began, in conjunction with M. B. Wynkoop and John Thomas, the firm of Wynkoop, Hallenbeck & Thomas, which commanded a large trade. Mr. Thomas afterwards withdrew, and the firm in its latest years added the two sons of Mr. Hallenbeck, William E. and Harry C. He was an active member and an officer of the first Typothetæ, and was at one time a president of the Typographical Society. His death occurred on May 6, 1891, the day after that of William C. Martin, the two men being the oldest members of the Typothetæ at the time.

JOHN J. HALLENBECK.

Hamilton, Andrew, a lawyer of Philadelphia in colonial times, who was called to New York to defend Zenger when he was charged with libeling the governor. That functionary had appointed some new judges, and they had disbarred the lawyers resident in New York who were most capable of making a defense. The court refused to allow Zenger to introduce testimony to justify the libel. Hamilton thereupon in a long and able speech so wrought upon the passions and feelings of the jury that they declared the defendant not guilty. This was in 1735. Hamilton was conducted by the friends of Zenger to a splendid entertainment, a salute was fired as he returned home, and the freedom of the city was given him in a gold box. From this defense rose the phrase familiar to every New Yorker, "smart as a Philadelphia lawyer." It established to a great extent the liberty of the press on this side of the water, contrasting most favorably with the harsh decisions in England at that time and for many years after.

Hammer.—The tool used by pressmen or machine-minders for locking up the forms on the bed or coffin.—*Jacobi.*

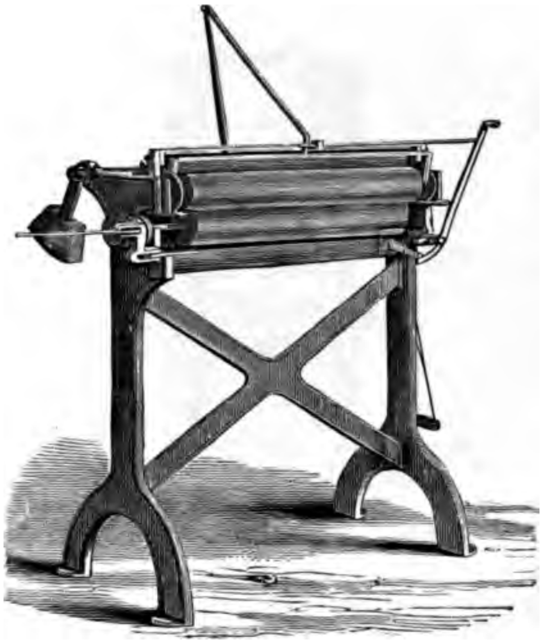
Hammond, William J., ex-president of the International Typographical Union, was born in Jefferson County, Mo., on September 8, 1836, and learned the printing business in the office of the St. Louis Republican. Afterwards he carried on a book and job office with a partner under the name of Charles & Hammond. He then removed to New Orleans. When the Civil War broke out he entered the Confederate service, serving to the close of the struggle. In 1875 he was elected to the Legislature of Louisiana. With these exceptions he has remained steadily at the case. He was elected the president of the International Typographical Union at its sessions in Cincinnati, Baltimore and Richmond, in 1870, 1871 and 1872. He also presided over the Federation of Organized Trade and Labor Unions of North America, held in Chicago in 1884.

Hand.—See INDEX.

Handbill.—A small bill, generally on book or news paper, intended to be handed to persons in the street, left at houses or places of business, or posted against walls. It is usually printed only on one side, and allows the use of black or heavy type. This term would not be applied to any very large bill, a sheet of medium being about the extreme.

Handful.—That quantity of type which is taken up at once in distribution or in making up when no cord is around it. It should not exceed four or five inches in length, as large handfuls are occasionally pied, even by the most expert men. Piling of one handful on another to a considerable height, as is sometimes seen, should be strictly forbidden by foremen.

Hand-Inker.—A contrivance to enable the pressman on a hand-press to do his own inking. Originally two men were required to work at a press, one to lay on the sheet and print it, and the other to ink the form. After the iron press became common a boy took the place of one man at the rear, but about 1830 Samuel Fairlamb, of New York, invented an inking-machine, by which the press did its own inking, more power being necessary than before, the action being perfectly automatic and uniform. Other inventors modified and changed this appliance, but all alike had some method by which the pressman, in running out the bed, wound up a pulley, which caused the roller to pass over the form after the frisket was thrown up. There was no question that the work was better done than by an ordinary careless boy. One of the first necessities was for a roller-stand behind the press containing one or two wooden rollers, upon which the composition roller was placed, and another was of a railway passing at each end of the bed and extending over on the roller-stand. It involved great labor on the part of the pressmen and was before many years superseded by the steam-inker and by the Adams press.


HAND-INKER.

Handle of the Press.—The lever which is seized by the workman on a hand-press and pulled over towards him. Where his hand touches it is large, round and smooth, a wooden surface being placed over the metal core.

Hand Letters.—Letters fixed in handles for the convenience of bookbinders, one in each handle. These letters should be of brass, as they are exposed to heat.

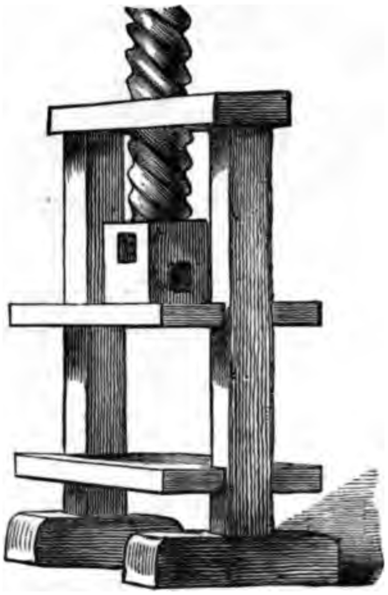
Hand-Made Paper.—Paper which is made entirely by hand, a slow and tedious process, used chiefly for fine editions. It is too expensive for general purposes. It has rough or what are known as deckle edges. It is either laid or wove, and can be obtained of many degrees of roughness. It is unsuitable for very delicate engravings, as the lines do not touch the surface well. Some very fine writing-papers are hand made. See PAPER.

Hand-Mold.—In type-founding the small instrument or frame within which the matrix is fixed. It is composed of two parts. The external surface is of wood, the internal of polished steel. At the top is a shelving orifice, into which the metal is poured. The space within is set according to the required body of the metal, and is made exceedingly true. The melted metal, being poured into this space, sinks to the bottom into the matrix. See TYPE-FOUNDING.

Hand-Press.—Those forms of the press which preceded the power-press, and which required only the force of one or two men to operate them. The earliest hand-press was undoubtedly very much like that now used as a wine-press in Southern Europe and as a press in warehouses in this country. It was a screw, turning through a nut, and as the screw was moved the necessary depression was obtained. This movement was very slow, and after the impression was obtained the platen had to be laboriously raised, although there was then no pressure. Among the first improvements must have been the sliding-bed and the frisket. No early print exists in which both of these are not exhibited.

The first substantial improvement was made by Willem Jansen Blaew, a native of Amsterdam. He caused nine improved presses to be made, each called after one of the nine muses, as Clio or Euterpe. The screw in this case was attached to a spring, which flew back as soon as the impression was taken. It was in 1620 that this improvement was originated. This form soon spread all over the globe, and continued, with a few modifications, to be the kind used until the introduction of the Stanhope press.

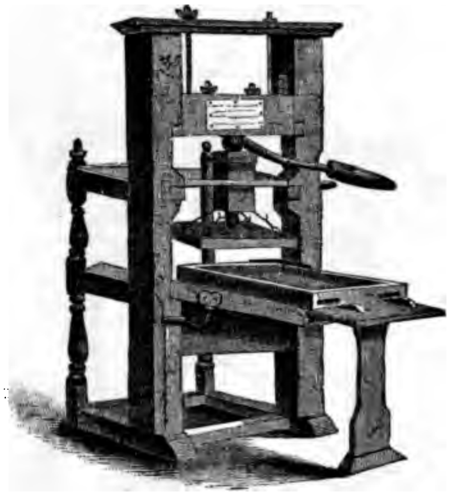
In the Blaew press the bed was of stone. It rested in a coffin, securely leveled and packed, and was run in part of the way to give a portion of the impression, and then a little further to complete it. This apparatus was all made of wood, except the stone bed, the points on which the screw and rounce revolved, and the nails and little screws. The main part was formed of two upright posts, mortised into a board on the floor and into a head-piece and secured against other timbers. Then there were three transverse timbers besides those at the bottom and top. The top was known as the cap; that below, which was of the same thickness, was the head, and the very heavy one next to the bottom was called the winter. The other parts were the feet, or the foundation frame; the till, a plank running from side to side, through which a square aperture was cut; the hose, passing through this aperture and holding the supports of the platen in a perfect position; the garter, a curved piece which held the spindle; the hooks, by which the platen was suspended; the worm or hollow, through which the screw passed; the nut, the hollow into which the end of the screw turned; eye of the spindle, the place where the end of the bar entered the shaft of the screw; toe of the spindle, the lower end of the screw, which comes to a point; shank of the spindle, the body of the screw; platen, the flat piece which is impressed upon the paper and the top of the type; bar, the lever by which force is applied; handle of the bar, that part which was caught by the hand of the pressman; hind-posts, the upright posts at the rear of the cheeks; hind-rails, the horizontal pieces of wood which pass from the cheeks to the hind-posts;


EARLY SCREW-PRESS.

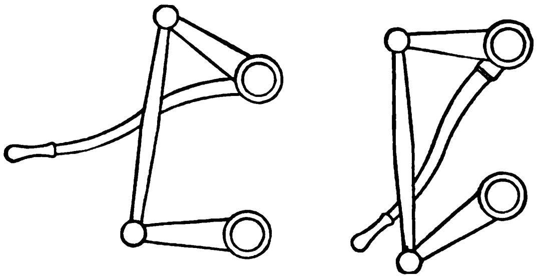
wedges of the till, the appliances used to tighten the hose in the till; carriage, that part of the press which supported the bed, a definition contrary to that now used; outer frame of the carriage, the outer part of this carriage; the ribs, the projecting pieces, of wood, but with a steel rail laid in, upon which the coffin or bed slipped; the forestay, the support of the end of the press farthest from the cheeks; the cheeks, the great upright posts which held the platen and the screw at all times, and the bed at the moment of impression; the winter, the thick block below the bed of the press at the time of impression, and which enables the bed to resist the action of the screw; the head, the corresponding piece above the platen; the spit, the axis upon which the wheel turns; the wheel, a round cylinder underneath the bed of the press upon which the straps which draw the bed of the press are wound and unwound; the rounce, the handle to the spit and wheel; the coffin, a square frame, forming part of the bed, into which the stone upon which the form was laid was embedded; the plank, the support for the coffin, but longer; the gallows, the stay for the tympan, when the bed was run out; the sockets, into which the gallows was fastened; the press-stone, where the form was deposited preparatory for printing; the tympan and frisket, being the same as now used; and the stay of the carriage, the piece of wood which stopped the movement of the coffin. Other names also were used. A press of the standard dimensions was six feet and one inch high, and between the cheeks one foot and eleven inches. The cap, which projected over all, was three feet long. The total length, allowing for the frisket when thrown out, was about eight feet. The largest form which could be taken was about twenty-six inches in length and about twenty-two in width, but only half of this could be printed at once, as the platen was not large enough, being only thirteen by nineteen inches. The strength of the press was not equal to printing a whole medium sheet, nor could the pressman exert power enough. As these presses were built chiefly by common carpenters and joiners, they were frequently defective. It was not until about the close of the last century that they were manufactured by persons who made a business of press-building. Dr. Franklin, in ordering a press and printing materials for his nephew to set up business in New Haven, found it necessary to give strict instructions to Caslon, the type-founder, who supplied him. This was in 1753. He says:

HAND-PRESS OF THE SIXTEENTH CENTURY.

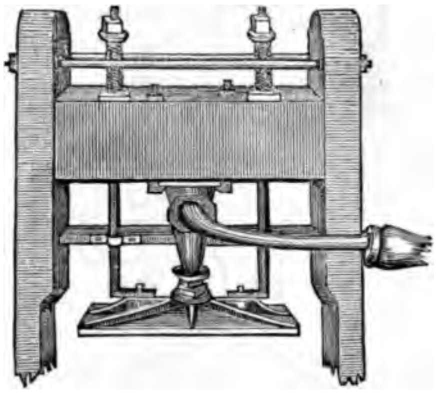
"If you can persuade your press-maker to go out of his old road a little I would have the ribs made not with the face rounding outwards, as usual, but a little hollow or rounding inwards from end to end; and the cramps made of hard cast brass, fixed not across the ribs, but longways, so as to slide in the hollow face of the ribs. The reason is that brass and iron work together better than iron and iron. Such a press never gravels; the hollow face of the ribs keeps the oil better, and the cramps, bearing on a larger surface, do not wear, as in the common method. Of this I have had many years' experience."


BLAEW PRESS, AS MODIFIED IN THE LAST CENTURY.

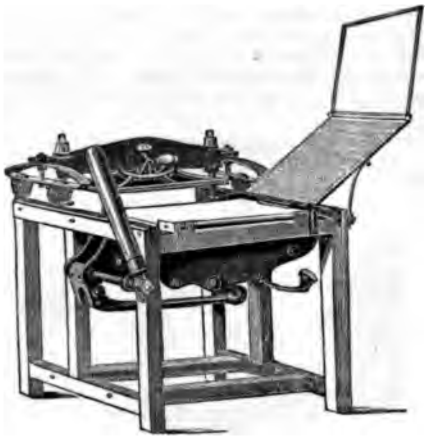
The hand-press thus described and made was in use exclusively until about 1803, when the Stanhope came in. Its largest size was medium, and its greatest performance two thousand sheets a day, thus being equivalent to about an hour's work on a cylinder press with a double-medium form. Much of the work thus done was exceedingly good, considering the imperfection of the apparatus. The first attempt to make any improvement, after the time of Blaew, was that of Anisson, a French printer, who about 1785 turned his attention to strengthening the hand-press. There is no detailed account of his invention, but it consisted chiefly in the substitution of iron for wood and the use of greater leverage. Lord Stanhope began his experiments about the close of the last century, and was aided in them by Walker, an ingenious machinist. In substance, they consisted in discarding all wood and making the whole apparatus of iron, while giving the downward descent of the platen upon


LEVERS OF THE STANHOPE PRESS.

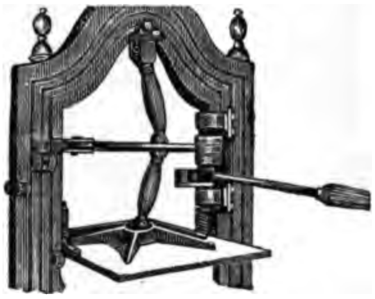
the form by means of a system of levers which accumulated the power towards the end. The old hand-press required as much strength when the pull was begun as at any time afterwards. One of the great novelties in this consisted in having the cheeks and the winter consolidated into one piece, called the staple. The sides curved outward, in order to give enough room for the table and form to pass through, and upon them were secured the ribs. The extreme width of the staple was four feet, and the height was three feet and eleven inches. Other pieces, differing from those in the wooden press, were the T, the wooden frame upon which the press was stood; the standard, or forestay, which was in the form of a fork, and held up the forward parts of the press; the main screw, thirteen inches long, serving to depress and raise the platen; the short head, fastened at the top of the screw and through the lever communicating power to it; the long head, the arbor and the coupling-bar, serving the same purpose; the bar and handle, pulled by the workman to make the impression; the piston, which received the lower end of the screw; the back plate and top plate, two unimportant parts; the balance-iron, knuckles and weight, serving to cause the bar and handle to return after giving an impression; and the table, or what is called in America the bed. Later press-makers invented new names for the parts which they introduced. The result of the construction of the Stanhope press induced many printers and some press-makers to apply a system of compound levers to the wooden press, which was strengthened somewhat; but these efforts were not productive of good results, for the framework, designed for much less force, weakened and yielded under the application of so much power, and speedily became so racked that the press could not be kept in order. The Stanhope press at first met some opposition from pressmen, as the character of the pull was so different from that to which they had been accustomed. The original charge for this press was ninety guineas for a demy size, 24 by 18 inches; later it was sold for sixty guineas. An iron hand-press of this size now sells in England at thirty-five guineas. The press was not introduced very rapidly. In 1820 the majority of presses used in England were wooden ones, which, until 1845, were considerably employed. Here and there one lingered until 1860. In America an iron press does not seem to have been used before 1811, nor were any made here until about 1817. Before that time, however, some daily papers in New York and Philadelphia had imported presses from England.


TOP PART OF THE RAMAGE PRESS.

Presses were soon made by many other persons in Great Britain. The Ruthven, invented by a printer of that name in Edinburgh, was in its highest part no more than four feet high. The lever was pushed downward by the pressman's left hand, aided by the weight of his body. The Roworth press depended upon two iron rods, which were somewhat inclined. When power was applied they were forced into a perpendicular position, thus developing much pressure. The Cogger press was built very strongly. It had a multiplied cross-arm lever, drawing about one-quarter round a collar, into which were fitted two studs of case-hardened iron with convex faces, which, when put into motion by the lever, moved up inclined planes of unequal degrees of inclination. The velocity decreased and the power increased, until in the end the latter was almost infinite. This press was much used. Other presses in England in early days were the Hope, Stafford, Barclay, Watts, Napier, De Heine, Russel, Prosser, Brown and Ridley. The Columbian, which arrived from America in 1818, became the popular press, and with the Albion is now the favorite in the British Islands.

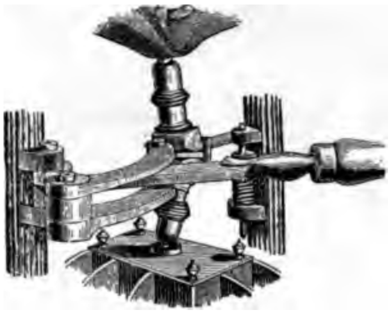

RUTHVEN PRESS.

No extensive manufacturers of wooden presses existed in America in the last century. Adam Ramage, who began business in Philadelphia somewhere about 1800, was the only one of much importance. His presses had a very solid frame of wood. After iron presses came in he reconstructed his old designs, substituting an iron bed for the old coffin and stone, and an iron platen instead of a wooden one. Up to 1837 he had manufactured twelve hundred and fifty of these presses. In 1844 they were quoted at $165 for the largest size, printing a sheet of about 22 by 32, but requiring two pulls. Washington and Smith presses cost at this time $210. The original price for this size in America was $400.


LEVERS OF THE WELLS PRESS.

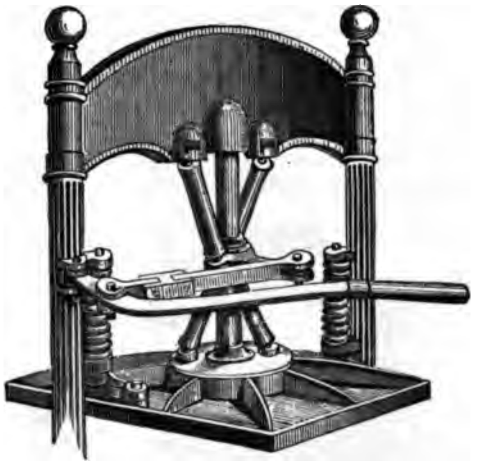
In 1818 George Clymer, who had invented a very ingenious press, took it to London with testimonials from the leading printers of New York and Philadelphia. See Clymer Press. It was very successful there and in the West of Great Britain, and was well received on the Continent. In this country, however, it has been very little used. The Washington and Smith presses were lower in price, very simple in construction and admirably built. Very few foreign hand-presses or power-presses have ever been used on this side of the water.

In America the earliest press on the new pattern succeeding the Columbian was probably the Wells. This was the invention of John I. Wells of Hartford. It had a system of compound levers. The first of this make was finished in 1819. In 1820 the Stansbury press began to be used, and in 1821 Peter Smith obtained a patent.



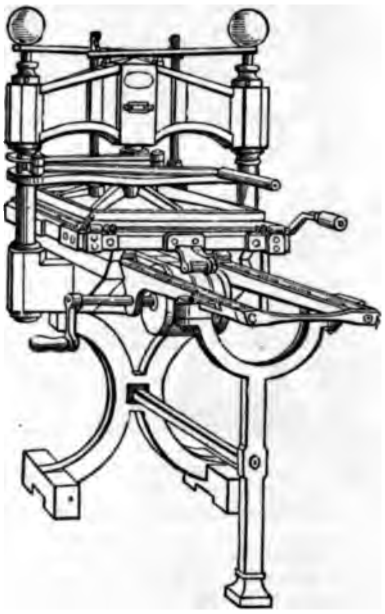
LEVERS OF THE SMITH PRESS.

This was the first of the long series of patents granted to the house now known as R. Hoe & Co. The press was manufactured by them for many years, but its production was discontinued about 1880, as the Washington press, also made by Hoe, answered every purpose and was more popular. The Smith press had the disadvantage that if the bar was suddenly let go when an impression had been taken it would fly back with so much force as to cause its parts to jump from their sockets. Its power was obtained, like that of the Washington press, from the straightening of a knee-joint, but they differed in one respect. In the Washington the knee-joint was pressed in; in the Smith it was drawn in. The Washington press was originally made by Rust & Turney, in New York, but was sold by them to another firm, which in turn sold it to the Hoes. The latter also afterwards manufactured the Stansbury press. Adam Ramage made a wrought-iron press, differing considerably in appearance from any other, which is still in limited use. Shelden Graves invented a press called the American, which was manufactured by Ramage. The Tufts press, manufactured by Isaac Adams, was and still is a popular press in New England. Several presses resembling the Washington were made between 1830 and 1860, but all have disappeared, and at present no other hand-press is made, with the exception of the Stansbury, used for hat tips, and the little amateur presses. Since the expiration of the patents upon this machine, however, several other firms than R. Hoe & Co. have taken up its manufacture. Certainly no piece of machinery could be better constructed or more suited to a workman.



LEVERS OF THE HAGAR PRESS.

The Washington press consists of two upright pieces, each standing upon two widely separated feet. These pieces are of hollow cast iron, with a wrought-iron rod inside, so as to diminish the danger of giving way when resisting the impression. Across the top is a thick piece of iron, against which rests the end of the upright lever by which force is applied. Below this deep head, and separated about two feet, is a correspondingly thick transverse piece which holds up the bed when moved in. The platen is suspended by two coiled springs and two rods. Upon the lower transverse piece of the press rest the two runways for the bed. At the farther end they are sustained by a single upright leg. When an impression is to be taken the frisket and tympan are furled down; the rounce is turned until the bed is directly under the platen; the handle of the bar is pulled, resulting in a corresponding movement in the other levers; the platen is forced down, makes the impression, and, aided by the springs, the bar falls back. The rounce is then turned in the contrary direction to its previous motion; the bed moves back, the tympan and frisket are thrown up, the sheet is taken off, and the bed is ready for a new rolling and the tympan for a new sheet of paper.



HOFFMAN PRESS.

In France those who have become known as inventors or manufacturers of hand-presses are Didot, Gaveaux, Thounelier, Villebois and Frapié. In general these improvements were later than those in England. In Germany Haas, Freitag, Hoffman, Deisler, Dingler, Schumacher, Hagar and others made improvements. Many hand-presses are still used in Europe on job-work and on work which would certainly be done in this country on cylinders.

Hand-Roller.—A small roller much used in taking proofs. It has a handle, dividing near the roller and having sockets by which the ends of the roller are held. Some hand-rollers, however, have two handles and are of considerable size.

Handwriting.—The deciphering of handwriting is one of the most difficult problems that a printer has to encounter. Most persons form some letters badly, but some have many bad ones. In each case the difficult words can only be translated by looking at the context. This difficulty is nearly always in the lower case, for when the capitals are hard to decipher and stand in a connection that does not instantly reveal them there is no use in puzzling over them. The difficulties to be surmounted are nearly always in the twenty-one lower-case letters most used, j, k, x, q and z occurring so infrequently that they are not likely to make the difficulty. It is impossible to make rules which shall show the irregularities of writers. They can only be learned by careful study.

The handwriting of some countries differs widely from those of others. A specimen of German script letters is shown under the head of GERMAN, PRINTING IN. The nations which have a handwriting founded upon the same basis that English has differ in many minor particulars. So, also, does the handwriting of to-day differ from that of the last century, and that from the styles prevailing in the sixteenth and fifteenth centuries. To understand them a special study must be made of the characters. This is known as palæography. See MANUSCRIPT.

Hanging-Galley.—A small galley, with hooks, to hang on the upper case. An English usage.

Hanging Indentation.—A method of setting type so that the first line of a paragraph shall be longer than the others. The first line is flush and the second, third and so on indented an em or two. This method is used by some dictionaries, and is largely employed on newspapers in book reviews when the title of a book is set forth at length. The following from the Holbrow Library, the title-page of the first translation of a classic into English made on the American continent, is an example:

OVID'S METAMORPHOSIS. Englished by G. S. (George Sandys). Imprinted at London, 1626. Original Edition. With Engraved Title by Cecil and Frontispiece by Marshall; Book-Plate of the Earl of Weems, 1706. Two Plates by Picart Laid in. Folio, half calf, red edges.

Hangs.—Type is said to hang when it is found to be out of the perpendicular. It is also said to be off its feet. The remedy for this, if the type is locked up, is to unlock the form and push up the face with the hand until the type is again perpendicular.

Hang the Platen.—To tie the platen to the hose-hooks in a wooden press.

Hang Up Paper.—To hang the sheets upon the pole to dry after they have been printed. Owing to the fact that nearly all bookwork is now printed dry, and that inks are made which will oxidize very rapidly, little is now done in the way of hanging up paper. Yet, as in the British colonies and in England American practices are not followed, the following is extracted from Hansard upon the subject:

"When the paper is worked off the warehouseman takes the heap and carries it to the room where poles are fixed for the purpose of hanging up the sheets to dry, and this most generally is the appropriation of every room in a printing-office that has sufficient height for the paper, when hanging on the poles, to be out of danger from the workmen's lights. He lays the heap down on a stool or table of a convenient height, then takes the handle of the peel in one hand and lays the top part down upon the heap, so that the upper edge may reach near the middle of the sheet, and with the other hand he doubles up so much of the printed paper as he thinks sufficient to hang up at one lift, which should be about seventeen sheets, as near as he can guess; or, if he has pole-room to hang them on, twelve and down to six, according as he can allow time for drying. Some warehousemen to forward their work will hang up a quire or more at a lift, which, through its thickness, keeps wet a long while, when it bears heavy on the pole; besides, it often draws out turpentine from the wood, which leaves a yellow stain upon the paper. But supposing the poles well seasoned and not likely to stain, still it is hazardous and ought on no account to be allowed. Some kinds of paper are much more liable to mildew than others, and particularly that part which rests on the pole, as it retains the water better than the sides, which, having the advantage of the air circulating between, get dry first.

"Having thus doubled the first lift on the peel he shifts the peel with his right hand two or three inches towards the lift, and then taking an equal quantity for another lift doubles that on the peel, and continues so doing until he has got as many lifts as the peel will carry. Then he raises it, holding it aslant, that the shorter fold of the sheets may open from the peel in order to convey them over the pole; and then drawing the peel from under rests the lifts on the pole, and inserting one end of the peel so as to take all the lifts but one he raises them so as to slide easily, leaving the next lift lapping about one inch over the first, proceeding in the same manner till he has disposed of all the lifts he carried up by that loading of the peel. He then at his table reloads and proceeds as before. It will sometimes be necessary, when the end of a pole is exposed to any strong current of air, as a window, &c., to lock the last lift. This is done by folding a lift two or three times so as to concentrate its weight in a small compass. By hanging this over the last lift near the window it will generally prevent the air from taking the sheets off the poles."

Hansard, Luke, an eminent English printer, was born in Norwich, England, in 1748, and served his apprenticeship to Stephen White of that city. When he was clear of his time he went to London and was engaged in the office of John Hughs, where his extraordinary diligence pointed him out as the proper man to assist William Day, the manager. When Mr. Day died the whole management devolved upon Mr. Hansard. In 1799 he became a partner, and in the following year succeeded to the entire proprietorship of the business. The office which he thus held in possession was perhaps the first in the world at that time in respect to the speed with which work could be turned out. The government offices in Vienna and Paris were for learned works; Didot and other great French printers paid little attention to dispatch, and the London offices were small compared with their present dimensions. The daily papers, from which something could have been learned were they like those of the present day, only employed eight or ten men on composition and five or six on presswork. Mr. Hansard was a man gifted with the power of organizing and controlling business, and endowed with the utmost energy. He possessed particular skill in casting off copy and also in laying out tables, both very necessary on hurried government work. A branch printing-office was opened to accommodate his business, his sons being taken into partnership with him under the title of Luke Hansard & Sons. He died in 1828, but the business is still carried on.

Hansard, Thomas Curson, an eminent printer of London, was the son of Luke Hansard, for many years printer to the House of Commons. He began business in 1805 in Peterborough court, where he was the successor to Thomas Rickaby, and on the expiration of his lease in 1823 removed to a more central location in Paternoster row. At one time he was a member of the common council of the city of London. His reputation is chiefly derived from the publication of his Typographia, a well-conceived and well-executed book, in which he gives thorough directions for carrying on every part of a printing-office, together with many historical and illustrative notes. He was in 1810 imprisoned three months for a libel of which he was only the printer and which did not come under his observation until the matter had been sent out. He was very successful in his business, and the trade are indebted to him for many valuable ideas. In 1806 he became concerned in the publication of Hansard's Parliamentary Debates, a stenographic reproduction of speeches in Parliament, a work since carried on by his successors. These publications comprise nearly five hundred portly volumes. He also brought out the Collection of State Trials and a Parliamentary History of England. This latter comprises thirty-six volumes in royal octavo. He died on May 14, 1833. His son, of the same name, wrote the article on printing and type-founding for the Encyclopædia Britannica in 1841 and revised it for the edition of 1859.

THOMAS CURSON HANSARD.

Hard Impression.—Where so much impression is given as to force the types into the paper.

Hard Ink.—Ink when too much boiled is thus designated.—*Jacobi.*

Hard Justifying.—If a compositor fills his stick very stiff with letters or spaces it is said to be hard justified.—*Moxon.*

Hard Packing.—An American system of making ready for printing dry paper.—*Jacobi.* A full account of this will be found under Making Ready.

Hard Paper.—Paper with a smooth, hard surface and compact body. It is a writing-paper. The best quality is tub-sized and loft-dried by the slow process of atmospheric evaporation. A well-made tub-sized and loft-dried paper will permit the use of the most caustic ink without spreading or blotting, will admit of a free and rapid motion of the finest pen without any scratching of the surface, and if of the best stock may be folded and refolded without cracking the fibres.

Hard Pull.—When the bar of the press goes stiffly it is said to be a hard pull.—*Savage.*

Hard Work.—With compositors, ill-written copy, much Italic, Latin or Greek or marginal notes, or few breaks, &c., is called bad, heavy, hard work; with pressmen, small letter and a large form is called hard work.—*Moxon.*

Harpel, Oscar Henry, a Cincinnati printer of high reputation who published the Poets and Poetry of Printerdom and the Typograph, or Book of Specimens. It may safely be said that much of the present high condition of American printing is due to Harpel. His borders and combinations, and the skillful selections for adornment made by him from the specimen-books, had been previously unknown, but were immediately imitated. He was an easy and graceful versifier. He learned his trade in Philadelphia, but had been a resident in Cincinnati for fifteen or more years before his death, which occurred on November 20, 1881, in Louisville, Ky. He was about fifty years of age.

Harper & Brothers.—This eminent publishing firm was founded by two printers, James and John Harper. The former was born on April 13, 1795, and the latter on January 22, 1797. Their father, Joseph Harper, lived at Middle Village, some five miles east of the city of New York, where he was a carpenter. James in his fifteenth year conceived the idea of becoming a printer, went to New York and sought and found a place. He was duly apprenticed to Abraham Paul, of Paul & Thomas, at the corner of Burling slip and Water street, in December, 1810. He did much drudgery there, but became an excellent pressman. John, the next brother, was apprenticed in 1812 to Jonathan Seymour, who had the reputation of being the best printer in New York, and he profited by the instruction there given. Five years was the term of service in each case. When James Harper completed his apprenticeship he worked in several other offices, including Seymour's, having as press companion there Thurlow Weed. As soon as John was free, he having purchased a portion of his time from his master, the two brothers formed a partnership as J. & J. Harper. They had saved a few hundred dollars, and their father lent them a little more. With this they bought a second-hand wooden press and some type, also second-hand. The office was on Dover street. Shortly after Joseph Wesley Harper was apprenticed to his two older brothers. The first book printed by them was Seneca's Morals. The publisher was Evert Duyckinck, a veteran bookseller, who had already done many favors for young printers. It is a curious fact that the last book printed during the lifetime of any of the Harper brothers was also Seneca's Morals, sixty years after. It issued from the press on the day that Fletcher Harper died. Two removals were caused by fire, first to 130 Fulton street, near Broadway, and then to 230 Pearl street. They very early established a high reputation among booksellers for swiftness and accuracy, and their work increased very rapidly. In 1818 or 1819 they began to publish for themselves, but still did work for others. They did not discontinue general printing until about 1836. In 1823 Joseph Wesley Harper was taken into partnership, having completed his time, and Fletcher Harper became an apprentice. In 1827 he also was admitted to the firm. About this time a bindery was added, and in 1830 a stereotyping establishment. The business had then become the largest of its kind in America, and it has since maintained this position, with the exception of the government office, which is larger. For years the members of this firm kept no accounts against one another, each drawing from the common fund as his necessities required. In 1830 they were partly burned out, and in 1833 the title of the firm was changed to Harper & Brothers. While at all times publishing original works, the bulk of their labors for many years was in reproducing English books. Their skill as printers enabled them to execute this work with more haste than their neighbors, and many of their moderate-sized books were brought out in thirty-six or forty-eight hours. Several series of books for libraries and schools were published which were in great demand, such as the Family Library. About 1833 they began to use a power-press, but it did not have a fellow for five or six years, the other machines in 1835 being thirty-seven hand-presses. About 1840 Adams presses were more extensively used, and in 1842 they printed upon one of them Harper's Family Bible, the first large work published in America for which overlays were systematically made and the forms thoroughly made ready. On this book, too, the first American electrotypes were used, the crude process which was then adopted destroying the woodcuts.

JAMES HARPER.

Until 1850 they occupied several buildings on Cliff street not made for a printing-office. A new edifice was then erected in Franklin square. On December 10, 1853, a workman threw a lighted match into what he supposed to be a pail of water, but which proved to be camphene, a highly inflammable liquid. The flames spread rapidly, and in a few hours everything was destroyed. With great energy the brothers proceeded to re-establish their business. New plates were manufactured, other presses were engaged, and in a few weeks everything was going on as before. A new building was erected wholly of iron. Three years before this the Harpers had begun the publication of Harper's Magazine, which proved a success at once. In 1857 the Weekly was issued. Later periodicals have been the Bazar, a ladies' journal, and Young Folks, for children. All these have been eminently successful. Among the most difficult works published by them in late years, considered from the printing standpoint, have been a Greek Lexicon, edited by Henry Drisler, and McClintock and Strong's Cyclopædia. In their establishment every process of making a book is performed, from writing, illustrating and engraving to binding and selling. James Harper was in 1844 mayor of New York. All of the brothers were earnest Methodists and gave largely in charity. James Harper died on March 25, 1869, in consequence of being thrown from a carriage. Joseph Wesley died on February 14, 1870; John on April 22, 1875, and Fletcher on May 29, 1877. They were succeeded by their sons, and they in turn by the grandsons, numbering among them many men of ability. The present members of the firm are Joseph W. Harper, John W. Harper, J. Henry Harper, John Harper, James Thorne Harper and Horatio R. Harper.

Harris, Benjamin, publisher of the first newspaper in America, issued by him at the London Coffee House in Boston on September 25, 1690, and entitled Publick Occurrences. It was printed on three pages of a folded sheet, leaving one page blank, with two columns to each page, and each page was about eleven inches in length. Richard Pierce was the printer. It was intended to issue this journal monthly, but the authorities condemned it, alleging that it came out contrary to law, and contained "reflections of a very high nature." They strictly forbade "anything in print, without license first obtained from those appointed by the government to grant the same." This seemed sufficient to crush the newspaper, and its existence was forgotten until a copy was discovered by the Rev. J. B. Felt in the State Paper Office in London some fifty years ago. No other newspaper was started in Boston until 1704. Harris was an Englishman who had been in the pillory for unlawful printing. He went to New England, where he was by turns bookseller, coffee-house keeper and printer, becoming the official printer of Massachusetts in 1692, but returning to London about 1694. There he was a printer and bookseller in Gracechurch street, and published a newspaper called the London Post. Dunton describes him as both ingenious and innocent.

Harrisburg.—The capital of Pennsylvania. Printing began here in 1791, with the Oracle of Dauphin, a weekly newspaper. The city is now a considerable centre of job-printing, and it does the printing for the State. There are now five dailies and eight other periodicals published there. Much bookbinding machinery is manufactured in Harrisburg.

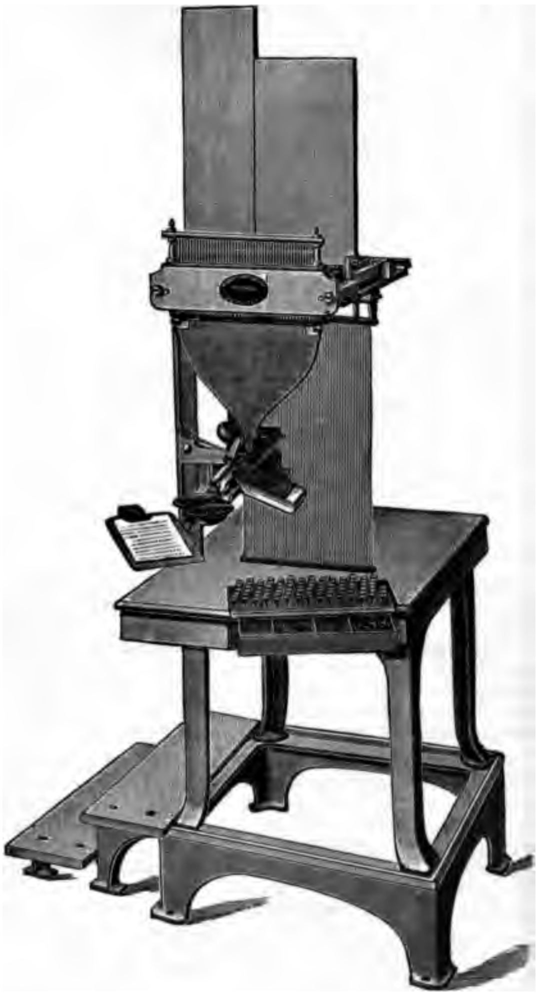
Harroun, Gilbert King, an inventor of printing machinery, was born at Corfu, Genesee County, N. Y., on September 23, 1835. He was graduated from the Brockport Collegiate Institute, assisted in surveying a part of the New York Central Railroad between Batavia and Buffalo, and was employed in several mercantile positions in that region. In 1857 he became the publisher of the Buffalo Daily Courier, and the next year was the junior partner in the firm of Sanford, Warren & Harroun, which succeeded to the ownership of the Courier. They also did a large job-printing business. In 1859 he secured a patent covering the attachment of a consecutive numbering wheel to a Gordon Firefly press, thus allowing the production of consecutively numbered railroad tickets. So much had the demand for tickets increased that he devised a railway coupon ticket printing-press, which would print and number consecutively any railway coupon ticket under thirty inches in length, or would produce in an hour 10,000 consecutively numbered railroad single tickets, as might be desired. The first ticket on the consecutively numbered plan by a printing-press was here produced. It was in 1860, and the ticket read from New York to Washington. There were six coupons. In March, 1862, Messrs. Sanford and Harroun removed to New York city, having sold their rights in the Courier to Mr. Warren, and taken his ticket-printing establishment. An immense business was done. In connection with consecutive numbering came the invention of cancelling stamps, with changeable dates, cases for holding tickets, punches to cancel with, each having a distinctive device, and a great number of blanks and blank-books, so that the tickets could be followed from printing till destruction. Many of the methods were imitated in banking, insurance and general business. When Mr. Harroun began he discovered that there was no paper made in rolls except for wall-paper, and no paper manufacturer was willing to undertake to furnish him with paper thus put up. Finally, by subsidizing a New Haven firm of paper manufacturers and giving them a bond of indemnity, they put in the proper machinery and he obtained what he desired. Shortly afterwards Bullock began using paper in the same way. In 1868 Mr. Harroun retired from business, selling out his interest, and sought to improve his health by a long voyage. Since his return he has been engaged chiefly in his own private affairs.

GILBERT K. HARROUN.

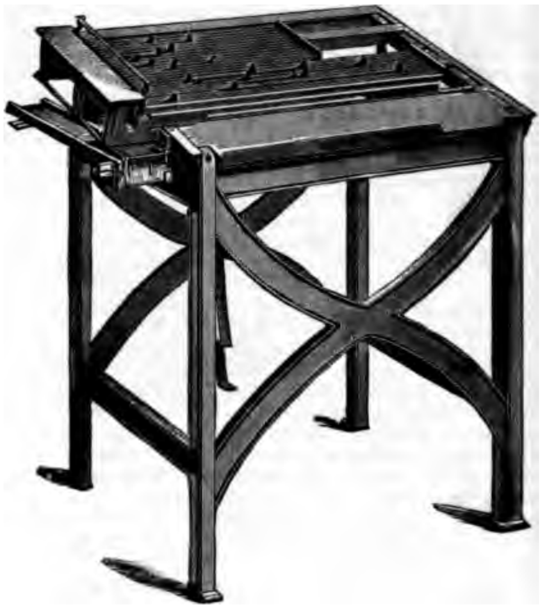
Harry, David, a printer who served an apprenticeship to Keimer in Philadelphia and succeeded him in business. He was extravagant and became involved, and within a year followed Keimer to Barbados, employing his former master as a journeyman. He again had business troubles, and sold his establishment to Keimer, who found friends to help him in the purchase. Harry then returned to Pennsylvania and became a farmer.

Hartford.—Thomas Green began printing in Hartford in 1764, Ebenezer Watson being a partner for two years. In 1769 the latter became proprietor, but died in 1777. His widow continued, in partnership with Goodwin, until she married Barzillai Hudson, thus carrying on business for a long time. Since the Revolution Hartford has been an important town in respect to typography. At that time and for years afterwards the "Hartford wits" had a high reputation, and several of them published books. One bookseller there brought out many works designed for children, and it also was a great centre of Bible printing. Later it was and still remains the chief town in the subscription-book business, many firms having grown rich from prosecuting this calling. As a natural consequence much printing is done there. It is also a centre in the insurance interest. Four daily and sixteen other newspapers are published in Hartford. Two typesetting machines are manufactured there.

Hattersley, Robert, the inventor of a typesetting machine, was born at Ripon, England, on September 3, 1829. He was apprenticed as an engineer in Manchester, and afterwards was employed in Germany and elsewhere in superintending the erection of cotton-spinning machinery. Subsequently he was engaged in the Calcutta mint. In 1853, having been prostrated by fever, he returned to Manchester, his attention then being called to the subject of setting type by machinery. He had a brother who was a printer, and in his work saw how slowly hand composition was executed. In June, 1857, he took out his first patent, and in April, 1859, produced a complete machine, the result of long practical tests. Discovering that the apparatus suffered from the lack of an efficient distributer, he turned his attention in this direction, and in 1872 produced one which was satisfactory. A short time before his death, which happened on February 18, 1889, he completed a ruby (agate) machine, the first ever made which would set that size of type.



HATTERSLEY COMPOSER.



HATTERSLEY DISTRIBUTER.

Hattersley Composing-Machine.—A machine built by Robert Hattersley of Manchester, England, and his successors. Upon a frame about three feet square and five feet high, without the pedestal, are held two type-charges, upper and lower case, which contain the supply of letters in horizontal channels. The ends of these channels abut and fit over the converging channels of the guide-plate beneath, and also come directly under the pushers, which are actuated by the keys when pressed. Thus, when a key is touched the pusher descends into the end of the type-charge and pushes out the end letter through the orifice at the bottom, which has just sufficient opening to permit the letter to pass freely into the converging channels of the guide-plate, and each letter is delivered upright in its order to form the matter to be composed. When the line is nearly complete a bell signals the operator, who then judges whether he can get in another word or syllable. The line is drawn down and pushed into the end of a machine composing-stick which will hold sixty lines of minion. The operator spaces out the matter as needed from two space-bowls placed close to the stick, and proceeds with the next line. With this machine there is a distributer, which is generally attended by girls. The two empty type-charges from the composing-machine are placed side by side across an inclined plane. A galley, similar to that ordinarily used in printing-offices, is provided for holding the matter to be distributed, and a small steel plate, to which is fixed an index-bar, is situated at the ends of the channels of the supply-tables. At the front edge of this steel plate is placed a double row of V-toothed steel combs. When the column of matter has been slipped upon the galley a line is taken or sliced off from its end into a distributing-stick held in the hand. This is practically a box capable of holding one line, and connected with mechanism by which the letters are pushed into the supply-tables. The operator having read the line contained in the stick points each letter at the corresponding letter indented on the index-bar, and the V comb before mentioned brings the stick into exact position for the openings of the channels, while mechanism connected with the stick pushes the letter down the channel. The stick being brought back the pusher recovers its position and is ready to eject the next letter. The mechanism is such that it is impossible for letters of greater thicknesses than the proper one to be passed into the channel, and as the type is distributed into the supply-tables in rows face upwards correction is made convenient and clean cases are insured. After the charge is filled it is removed entire from the distributer and is ready for placing in position on the composing-machine, which may thus be entirely recharged with type in half a minute. The girls soon get expert, and earn twenty shillings a week, at a penny a thousand ems, or four cents a thousand ems, thus making their week's work about one hundred and twenty-five thousand ems. The type-setter claims a speed of three thousand ems an hour.

Hat-Tip Press.—A press used to print by gold-leaf upon silk or satin for the interior of a hat. The plate or types must be hot. The methods are the same as in bookbinding.

Hatton Machine.—A small treadle platen machine manufactured in England.

Hausse (Fr.).—An overlay.

Haven Cap.—In England, a size of brown paper 26 by 21 inches.

Head.—1. The space at the head of the page. 2. The top of a book. 3. The title or caption of an article in a newspaper or magazine. 4. The end of a stick, or the solid part against which the end of a line presses. 5. A solid block of wood, used in the hand-press of the last century and before, situated some little distance above the bed, and against which acts the screw used to give the impression to a sheet. This is resisted below both by the bed and the winter, a correspondingly thick block.

Head and Tail.—The top and bottom of a book.

Head-Band.—The ornamental piece of silk or cotton used at the top and bottom of the back of a book to give a finish to it.

Heading-Chases.—Chases made for the headings in account-books and in blanks. They are wide, but of little length.

Head-Line.—The caption at the head of the page, in the same line with the folio. In a newspaper, the caption of an article.

Head-Page.—The first or dropped page of a book, or one of its chapters or sections.

Head-Pieces.—Engraved blocks of wood used at the heads of chapters and divisions of books to take away the impression of bareness which these great open spaces would otherwise give, or for purposes of pure ornament. They may also be in type metal or on steel or copper, although the last are very rare. Printers who do a business of any size ought to have numbers of these engraved for their own use, and not depend upon the stock derived from the type-founder. They give an individuality to their work which cannot be obtained otherwise. If intended for long use it is well to conventionalize them and make the lines of some considerable thickness. Very fine lines will soon wear away. See TAIL-PIECES.

Head-Rule.—The rule sometimes used after a head-line in a book; the rule at the top of a page of a newspaper.

Headsticks.—Furniture put at the head of pages, when imposing, to make margin.

Heads and Signatures are included in the measurement of pages by the employing printer, as they used to be by the journeyman. This type must be supplied and put into its place as well as the other lines, and it must always be charged for.

Health.—Much attention should be paid in printing-offices and bookbinderies to health. There is nothing really injurious to life in either printing or bookbinding, but the bad sanitary arrangements frequently found and the carelessness of those employed in these occupations frequently result in permanent injury. In the early part of the century, when most printing-offices were in garrets, drinking habits were common, and closets were not provided, health was early impaired; but at present it is not uncommon to see at work in printing-offices men who are past seventy years of age, and there are a number now living in New York who are past eighty. One at eighty-five goes regularly to his employment. The needs of the trade are good light, air and water; freedom from dust and draft; sufficient heat and necessary conveniences. All offices should be laid out so that the compositor shall have abundant light upon his cases. If he learns his trade in a dark corner it is likely to result in his picking up false motions, for he cannot see how to take up his letters correctly. His eyes are certain to be strained and to become injured by the undue tax, and a habit of rubbing them is engendered. Perhaps rubbing them, if the knuckle were perfectly clean, would not result in much harm, but it is most generally done with the end of the finger, and the lead dust enters, inflaming the eye, descending through the lachrymal canal into the nose and thence into the mouth and stomach. Colics and lead-poisoning result from this, if long kept up, and falling-wrist is an extreme injury from it. The harm done, however, does not usually go as far as this. The fingers should never be allowed to touch the eye when there is the least lead-dust upon them. Until a generation ago it was common for compositors to put their wet cases by the fire to dry them. The compound of lead and antimony of which type metal is made gives off when heated very injurious fumes, and paralysis and lead-poisoning were then much more common than now. The fingers must not be allowed to touch a sore or wound, as they irritate and keep up the inflammation or injury by the metallic dust there deposited. Dust also enters the nose and mouth from blowing out cases, which, however, is necessary from time to time. This cleaning should always be done in a closet away from the composing-room, as the dust if blown out there immediately settles on other objects in that room. A convenient method of getting rid of the dust is to take the wire case-covers now made, fasten them on securely, reverse the case and then knock out what remains, blowing off that which is upon the type. This is an easier and more perfect way than by blowing out the whole.

The windows should be high and broad, and so arranged that the upper sashes can be let down. Curtains should be at every window in which the sun ever shines. There must be an abundance of water, and more than one faucet or wash-dish for washing hands, if the number of persons employed is at all great. Soap and towels should be provided by the office, and the latter should be frequently changed. There is no excuse anywhere, except perhaps in an electrotype-room, for the black towels which are occasionally found. In cases where the office will not provide towels, the compositor should do so himself. The place for washing should be light, so that the condition of the hands can be clearly seen. Permission to eat lunches in the rooms should not be given to those who will not see to this very important matter of cleanliness. There is no doubt that lead-dust is poison. There should be some contrivance for boiling a kettle of water in the room or near by, that tea or coffee can be made by those who do not desire to go out. If the office, however, is large and rich and can spare the space, it would be better to set aside a room where a dozen men can sit down at once and eat their lunches. It would be better still, however, if the men should go to their homes. It is much more advantageous to them. Heat should be properly attended to. There are certain men who wish the thermometer kept beyond 70 degrees, and some even desire it as high as 74, while there are others who would prefer to have it at 65, 64, 63, or even 62. Those who desire these extremes are always, however, in the minority, and the range may be limited from 66 to 70, and the exact degree can be determined by a vote of the men. The foreman's feelings are not a guide. He does not exercise as much as some of the others, and he very frequently wears a coat the whole time. Ventilation should be seen to by an engineer, and ought to be good.

An abundance of water-closets should be provided, those for the men separate from and at some distance from those of the women. They should be provided with tanks overhead, so that a sufficiency of water will always be available to flush out the pipes. Toilet-paper is dearer than waste-paper, but the bills for plumbing are far more moderate where the former is used.

With artificial light there is danger that the eyes may suffer, particularly with electric lights which show the pulsations of the engine which gives power. A shade should be worn over the eyes with all artificial lights. In country towns where petroleum is used workmen must be cautioned against turning their lights down. It saves a little oil, but the combustion then becomes very imperfect and the air is soon filled with deleterious fumes. The practice results in lung diseases. Petroleum should never be burned except with the flame at its utmost, just below the smoking-point. Ice should be supplied to the men and women at the expense of the office. It is unhygienic, but is craved by every one in summer time, and also prevents many men from resorting to ale-houses and beer-gardens. No alcoholic beverages should be allowed, nor any so-called temperance drinks peddled. As made by or for peddlers they are vile concoctions; but ginger pop and lemonade, made in the place, are not liable to the same objections. Peddlers should be forbidden to bring in decayed bananas or fruit, or anything which is injurious to health, and the foreman should occasionally stop them and examine their baskets. A mutual medical assistance society is an excellent thing to have, charging, say, twenty cents a week to each man and giving him five dollars a week in case of sickness, or charging more and granting a greater allowance. Such societies are in existence in nearly all of the larger offices in New York.

In connection with this subject it may be said that computations have been made in England about the death rate among printers. Dr. Ogle, who conducted the inquiries, states that the death rate has lessened materially. According to the results in other occupations there would have been a mortality of 1,071 out of an assumed population of 64,641 printers between the age of twenty-five and sixty-five. Their real mortality was 678, three being occasioned by lead-poisoning. The amount of lead-poisoning, however, in a given industry is not, as Dr. Ogle points out, to be measured so well by the deaths attributable to this cause, for these would probably be only the cases of acute poisoning, as by the deaths attributed to diseases of those organs which are known to suffer from chronic exposure to the influence of lead. There was a high mortality in phthisis (consumption). The deaths registered as due to this cause were 461 to the thousand, as against an average of 220 for all males. This was attributed by the physician to dust.

Heap.—As many reams or quires as are set out by the warehouse-keeper for the pressmen to wet. The quantity of paper furnished at one time to the pressmen.

Hebrew.—The language used in Palestine in early ages, and in which the Old Testament is written. It is a branch of the Semitic languages. Arabic, with which the Ethiopian is closely allied, is one Semitic language, and the Aramæan, in two dialects, known as the Chaldee and Syriac, is another. The Phœnician and Punic are the remaining tongues of this group. Very little remains of any early Hebrew excepting what is contained in the Bible; but a large literature has developed among the Jews since the dispersion, mostly upon points connected with their customs, laws and ecclesiastical usages. The Talmud is the greatest storehouse of this literature. It is divided into two collections, the Jerusalem Talmud, compiled before the fifth century, and the Babylonian Talmud, in the sixth century. Each of these is divided into two parts, the Mishna, or text, and the Gemara, or commentary. The books of the Old Testament were written at various times, the Pentateuch containing the oldest writings now preserved, exceeding in antiquity those of Greece. The earlier books, it is supposed, were brought together by Ezra. The spoken language was extinct among the common people at the close of the Babylonian captivity, and it was discontinued in writing and conversation among the upper classes during the century preceding the advent of Christ. The New Testament has been preserved to us in Greek, and if, as is supposed, the originals of the synoptical gospels were in Hebrew they speedily disappeared. The language of the common people then was in Aramæan.

After the destruction of Jerusalem, A. D. 70, the Jews were scattered among all of the nations of the earth. The Talmud previously spoken of was an attempt to gather up the knowledge still extant among the people concerning their history and holy things, with explanations, so that the memory of them should not be lost. Upon religious matters the succeeding writers have been voluminous, and something has been contributed by authors in this tongue upon other subjects, small, however, in comparison with strictly Hebraic matters. They are now most strict and well informed in religious matters in Poland, taking that country in its ancient extent, and most productive in a literary way in Germany. To that country are sent English and American Hebrews who desire to fit themselves for the position of rabbi. In these two countries Hebrew mixed with the vernacular is spoken, written and printed, the compound being barbarous but easily understood by people of the Hebrew race. It is supposed that the number of the Jews in the world may be seven or eight millions. All receive some instruction in Hebrew.

The degree of civilization which the Hebrews attained in early times seems to have been indigenous. A shepherd tribe, emigrating to Egypt and remaining there for a few generations, they imbibed from the dwellers in that kingdom some of the philosophy and knowledge of which it was the centre, but their subsequent intercourse with other nations was small, and their literary and religious growth seems not to have been much influenced by the Egyptians, Greeks, Phœnicians or Syrians. Only in the time of Solomon did they attract the attention of foreigners. Thus their language altered very slowly. When they became exposed to troubles with other countries their speech took on new expressions, and finally ceased in its older form to be talked at all. The Christians paid little attention to Hebrew when they began the study of the Scriptures, and most of their commentaries were upon the translation of Jerome or the older Latin version. This indifference to Hebrew continued till the seventeenth century, nor were there good Hebrew grammars and lexicons in existence for non-Hebraic scholars till about two hundred years ago. Since that time the study of its rules and the determination of the meaning of its words has been assiduously carried on. This vocabulary is scanty, however, and with many words which have only one or two ancient examples it is difficult to conjecture what the meaning may be, as, for instance, the word "selah," which occurs frequently in the Psalms. The study of Hebrew literature and grammar is most thoroughly pursued in Germany, as there are many highly educated men there who have theological knowledge, and the Jews in that country have also done much to elucidate the difficulties in their language.

The language reads from right to left. Almost every word is composed of three characters, which are consonants, and have a syllabic character, the vowels not being expressed or being shown only by points. These consonants are generally persistent or unchangeable in all derivative forms, the inflexion being that of the vowels. The verb, in respect to tenses and moods, is scanty, but there is a variety of conjugations which show repeating, causation, suffering, and so on. There are only two tenses. There is very little distinction of case. All nouns are either masculine or feminine. There is almost no syntax. The style only admits of stringing together certain words, tied with the conjunction "and" and with a verb.

Hebrew Cases.—Cases used for composing in that language.

Hebrew Printing.—This is the most difficult work which comes into an ordinary printing-office, the trouble arising from its accents. These are not indispensable, but nearly every commentator or author demands them, and as these marks are minute, causing them to be easily battered and broken, they cause much labor and anxiety. There are twenty-two letters, most of them somewhat square in shape. Some of these have two forms. The letters of the alphabet are as follows:

Form.	Final Form.	Equivalent.	Name.	Signification of the name.	Numerical value.
א		'	Aleph	Ox	1
ב		b, bh	Beth	House	2
ג		g, gh	Gimel	Camel	3
ד		d, dh	Daleth	Door	4
ה		h	He	Window	5
ו		v	Vau	Hook	6
ז		z	Zain	Weapon	7
ח		ch	Cheth	Fence	8
ט		t	Teth	Snake	9
י		y	Jod	Hand	10
כ	ך	k, kh	Caph	Bended hand	20
ל		l	Lamed	Ox goad	30
מ	ם	m	Mem	Water	40
נ	ן	n	Nun	Fish	50
ס		s	Samech	Prop	60
ע		'	Ain	Eye	70
פ	ף	p, ph	Pe	Mouth	80
צ	ץ	ts	Tsaddi	Fish hook	90
ק		q	Koph	Back of the head	100
ר		r	Resh	Head	200
שׁ		sh or s	Schin	Tooth	300
ת		t, th	Tau	Cross	400

The names here given to the letters are those used in the King James version of the Scriptures. They are spelled very differently by modern authors, but no two agree on the same form. The significations are those which have descended to us from early times, although the resemblance is in many cases not now to be perceived, and the accuracy of the definitions, like much other ancient history, is doubtful.

The five characters which have a different shape at the end of a word (final letters), ץ ף ן ם ך, terminate, with the exception of ם, in a perpendicular stroke, directed downwards, while the common form has a horizontal connecting line, directed towards the following letter.

Hebrew is read from right to left. The division of a word is not allowed. To complete a word certain letters are at times dilated (made broad). These are in our printed books the five following:

ﬨ	ﬦ	ﬥ	ﬤ	ﬡ
Tau.	Mem.	Lamed.	He.	Aleph.

Another method in Germany is to borrow a letter or two from the next line, enough to fill out the measure. The same letters are again used in their proper place. In some work abbreviations are used, but this is not allowed on the Bible. The sign of abbreviation is an oblique stroke, like an acute accent, at the top of the letter, but before it.

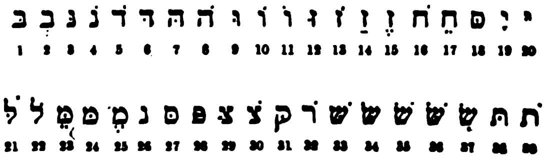
The Hebrews had no special marks for numbers. The numeral system shown is not employed in the Old Testament text, and is found first on coins of the Maccabees, in the middle of the second century before Christ.

The vowels are indicated by points, somewhat as they are in shorthand by Pitman's system. By this method brd may stand for bread, bride, bird, board or broad, by adding vowels, so that a Hebrew word of three letters expresses the changes of time, place, intensity or meaning by a difference in the vocalization. When the language was without accents it must have been much more difficult to understand manuscripts than now. There are three primary vowel sounds, a, e and o, the e also indicating an i, and o the u sound. As a rule, these vowels are placed below the consonant to which they refer, but are occasionally over and sometimes inside of the character. As only three principal vowel sounds were distinguished, no others were designated in writing, and even these were represented, not by appropriate signs, but by certain consonants, whose feeble sounds had a very weak affinity with the vowel sounds to be expressed. Thus ו represented u and also o; י represented i and e. A was regularly omitted, except at the end of a word where long a was represented, in Hebrew, by ה and more seldom by א. These two letters stood also for final e and o. Until Hebrew ceased to be a spoken language no other signs for vowels were employed. Guesswork must have been resorted to. Thus דבר, differently vocalized, meant dabhar (a word), debher (a pestilence), dibber (he hath spoken), dabber (to speak), dobher (speaking), dubbar (it has been spoken).

In Hebrew certain deviations from custom in other languages are allowed, as setting words in larger type to indicate adoration, and in smaller type to express detestation or enmity. Certain combinations must be avoided, as they use characters which can only be employed respecting the Deity.

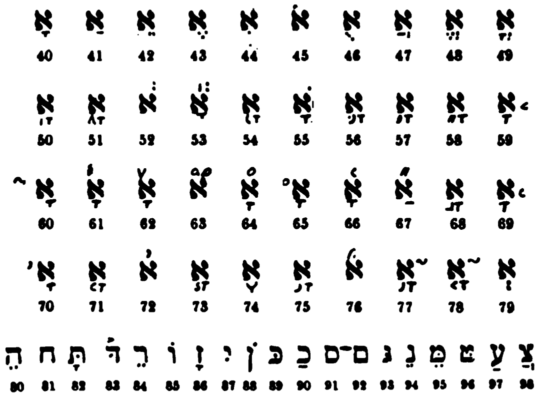
Hebrew employs many accents. Besides the vowels, half vowels, a syllable divider, a compounding letter, rhythmical accents, and marks showing the stress of voice, with its cessation, are given. The latter answer nearly to our punctuation marks. There is a series of very slight vowel sounds, which may be called half vowels. The most prominent of these sounds is sheva, like a colon below the line. Its pronunciation is like that in a hurried attempt at every, which most people would then say ev'ry. Where the apostrophe is would be denoted in Hebrew as ev:ry. There are seven of the common accents, cast in or used separately from the letters. Qamets, like a small Gothic capital ᴛ at the bottom of the line; pattach, a hyphen _ below the letter; seghol, like three little dots, in the shape of an inverted ∵ pyramid, also below the letter. These three marks indicate a. Chireq is a period . below the line; tsere is a colon .. laid sidewise, also below; shurek is a dot at the side; qibbets is three dots in a ⋱ staircase, and cholem is a dot over the top. The vowel sign is put under the consonant after which it is to be pronounced. There are one or two exceptions. A short dash even with the top of the letters connects the words together.

The accents and peculiar letters are in part as follows. The first accents are from 1 to 39, being the most usual ones:



THE MOST USUAL HEBREW ACCENTS.

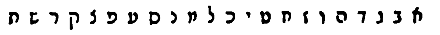
The other accents, either in combination with the character aleph or not, follow. The explanation of all must be sought for in Hebrew grammars, of which there are many in English:



OTHER HEBREW ACCENTS.

These accents are by no means all which can be used. Many of them must be inserted in the electrotype-plate, and it is therefore advisable to lead all copy in Hebrew. If in fair-sized type, the letter having little shoulder, there should be a nonpareil slug between, this giving an opportunity for most of the extraordinary accents to be justified in. Composition is done in English offices usually by setting from left to right, the nick being against the composing-rule. The bottom accents are justified in against the letters, and then the whole is turned around. The Jewish offices of New York, however, it is found by inquiry, do not do this, but set from the end of the line forward, and after it is justified put in the separate accents. The only method in which Hebrew can be done in ordinary offices is on time, the compositor as well as the employer being thus paid. By De Vinne's Price List, Hebrew, if without points, should be charged for at $1.30 for reprint and $1.60 for manuscript; with vowel points on separate body, each to be cast up according to the body when made up, $2 for reprint and $2.10 for manuscript; kerned, with vowel points, $4.25 for reprint and $4.50 for manuscript; kerned, with vowel points and accents, $4.75 for reprint and $5 for manuscript. These prices should only be used for strict bookwork, on an order of not less than one hundred thousand ems. They are entirely too low for pamphlets. Hebrew words with vowels on kerned letters are estimated at eight cents each if they do not require to be justified in, and twelve cents if they do. If without points, six and nine cents. All extras are also counted.

Another Hebrew type is common, known as the Rabbinical. It is used in familiar letter writing and in ordinary matters, the letters employed in the Bible being regarded as too sacred to be used in the common affairs of life. The following are the characters:



There are peculiar final letters.

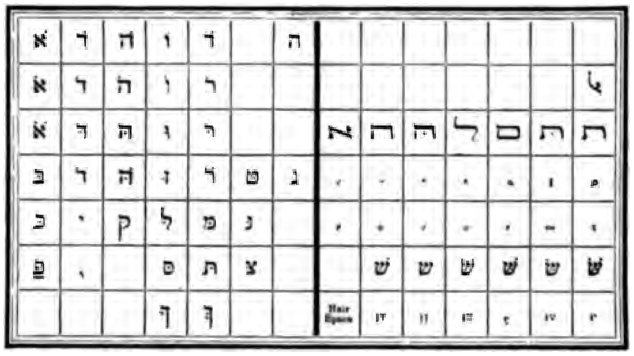
Another form yet is the deutsch-rabbinische or jüdisch-deutsche characters. Throughout all countries in which Hebrew is yet spoken by a large number of persons it has been modified and enlarged by the language of the country, and thus a corrupted idiom arose. In Germany in particular this is the case. The printing there is done in a character somewhat like the Rabbinical, but differing in many letters. German is also written by them in Hebrew characters.

The abbreviations in current German-Hebrew, Spanish-Hebrew or Polish Hebrew manuscript cannot be imitated in type, as they are too numerous and too peculiar.

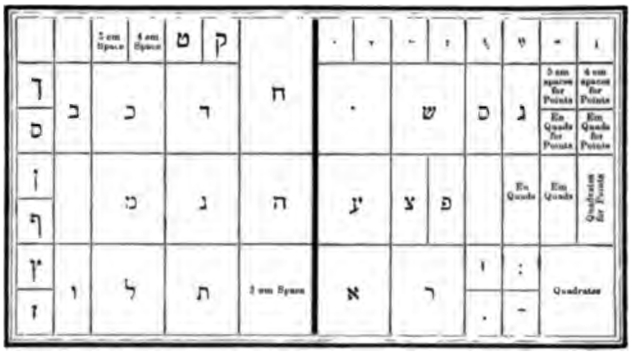
The case in Hebrew, as shown by MacKellar, is given upon this page.

In an ordinary font of Hebrew, containing 10,000 alephs, or a's, the proportions of the most used letters are as follows: Aleph, 10,000; beth, 2,800; gimel, 3,000; daleth, 4,500; he, 10,500; vau, 12,000; zain, 3,000; cheth, 5,000; teth, 2,000; jod, 11,000; caph, 8,000; final caph, 1,600; lamed, 10,000; mem, 8,000; final mem, 3,000; nun, 5,000; final nun, 2,400; samech, 2,100; ain, 4,500; pe, 2,000; final pe, 1,400; tsaddi, 1,600; final tsaddi, 1,100; koph, 1,800; resh, 6,000; schin, 12,000; tau, 2,800. The whole font, excluding accents and peculiar marks, as well as dilated letters, has 137,100 letters. They therefore occur in frequency in the following order: S, v, y, m, h, a, l, k, n, r, ch, ain, d, p, g, z, b, tau, ts, s, teth and q. The first seven letters as here given are more than half the font, and with the next three about three-quarters.

In executing Hebrew works, if many special marks are employed, no more convenient method can be suggested than that of electrotyping and inserting some of the special marks in the plate, all having been put into type that was possible. No font would have all characters, and much time would be lost in having them cut and cast by type-founders. Where it is proposed to make these alterations in the plate space must be left above the letter or wherever else the marks are to come. Tables can also be drawn by an expert



HEBREW UPPER CASE.



HEBREW LOWER CASE.

draftsman with india ink, and then photographed, so that process plates can be made from the originals.

The use of Hebrew types in printing dates back to 1475, when in three cities of Europe they were employed almost simultaneously. The entire Hebrew Bible was printed at Soncino in 1488 by a family of German Jews. Few offices in America below the first rank are provided with a stock of type in this language.

Hectograph or **Hektograph.**—A method of producing copies from a compound of glue and glycerine. A thin, even slab of this is cast, upon which the paper to be copied is laid face downwards. When it is judged that the sheet has been there long enough it is lifted, the bulk of the ink having soaked in the meantime into the upper layer of the glue and glycerine. Other sheets laid upon it and gently pressed take off enough ink to secure a perfectly legible fac-simile, and this the compound continues to do until from twenty to fifty copies are ready. In some cases even one hundred copies have been printed. Ordinary copying-ink or a special ink gives the best impressions.

Heft (Ger.).—A book unbound is geheftet; a stitched part of a book is a Heft. Theil is a part, and Hefte might be translated freely as numbers.

Height to Paper.—The length of a type compared with other type. A letter which is lower than another will not print, as it receives no ink and no pressure; this is low to paper. A letter which is too long is high to paper. There has long been a discrepancy between the heights of type cast in Boston and those in other parts of the United States, but there is a much more marked discrepancy in English foundries. In the Oxford University Press there are two divisions corresponding to the works executed there. One is called the Learned side and the other the Bible side. To prevent mixing fonts or borrowing in the two parts of this printing-office two lengths of type are cast, corresponding neither to each other nor to those of any other British foundry. They differ more than the sixteenth of an inch. Some type made for amateurs in America is only half an inch tall. The correct standard is ninety-two one-hundredths of an inch. Copperfaced type is a little higher to paper than other type, as there is a film of copper on the top. Stereotyping by the papier-maché process has a tendency to make the type long, as the letters are heated under pressure and have only one way to expand. If, then, the next time that this type is used after distribution it is mixed with other type which has not been so used the unused letters are low. So in a matrix-casting machine enough matrixes must be provided for any possible occurrence of little-used characters, while not many more are given for the much-used characters. A particular matrix bearing the character j, having been unused for half an hour, and therefore being cold, is placed between an n and an o, each having been used fifty times within that half hour. Hot metal has been poured against them, and they also have become hot, too much so for the hand to hold. Naturally there is much unevenness in the bar made from this assembled line of matrixes.

Heliography.—A general name for all of the various processes for printing on a sensitized metal plate by means of photography or sunlight.

Heliogravure.—Goupil's French process, by which the object is photographed on copper and etched, the result being not unlike copperplate in aqua-marine.

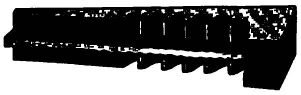
Heliotype.—A method of photography analogous to the process of lithography, in which the printing surface, after exposure to light passing through a photographic negative, acquires the power of absorbing water in the exact proportion in which it has been protected from the action of light, and also takes ink in the exact ratio that it has, in consequence of the action of light, acquired the power to repel water. Between the years 1869 and 1872 Ernest Edwards, formerly of London, now of New York city, made a number of improvements in collotype printing which resulted in the heliotype. The most important features of the improvements are the hardening of the gelatine film by chrome alum, and detaching it from the support upon which it is first prepared. When completed it is a thin sheet or skin of gelatine, tough and flexible. For printing it may be placed on a plate of zinc or attached to a cylinder. It may be preserved and used for printing as occasion may demand. See PROCESS PRINTING.

Heliotypography.—An early name for one of the methods of process engraving.

Hell.—The receptacle for broken and battered letters; the old-metal box; the shoe. It is sometimes spoken of as the hell box. A term analogous to this is the French and Italian devil's box.

Hempel, Henry Adolph, the inventor of the Hempel quoin, was born at Waltersburg, in the duchy of Gotha, Germany, in 1836; he served his apprenticeship in the government printing-office of Englehard & Reyher, in the city of Gotha, and came to the United States in 1866. He was employed at various places here as a printer, and in 1873 conceived the idea of a mechanical quoin. Hempel's experiments were continued until in 1878 he devised his present arrangement, which has, however, since been modified and has proved successful.

Hempel Quoin.—A metal quoin in the shape of a parallelogram, divided the longest way diagonally. By the action of a key operating upon ratchets the narrow parts of these two wedges are driven outward, and the thickness of the quoin is increased. A tongue in one part fits into a hollow in the other, and thus prevents any slipping up or down. In practice this quoin is found to hold well and to lock up conveniently and strongly.



THE HEMPEL QUOIN.

Henry, John, an inventor of printing-presses and a writer on typography, born in Ireland in 1818, came to New York in the year 1843 after learning the printer's trade. In 1858 he began the publication of a journal called the Printer, the first devoted to the interests of the trade in this country which was not linked to the fortunes of some type-founder or ink-maker. It continued with regularity until 1865, and a few numbers were published after that date. Much that is valuable to the typographical historian is found in its pages. He a short time afterwards edited the Typographic Messenger for James Conner's Sons, but in 1868 began the manufacture of printing-presses. They worked well, but Mr. Henry made no money from the venture, and finally sold out his rights. He later invented many devices which were popular, and also contributed many articles to the printing-trade journals. He died on May 13, 1889.

Henry Press.—A press made of various sizes suitable for printing country newspapers, job-work or books and invented by John Henry. It was a large cylinder, and was brought out about the time of the war. It had a crank, by which the pressman could move the machinery, if desired, no steam being required.

Hens.—The end-pieces of a brace. The centre is a cock, and together they are a cock and hens.

Herausgeber (Ger.).—A publisher or editor; not necessarily an author or writer. The expression is used in connection with pamphlets, newspapers, reviews and periodicals.

Herausziehen (Ger.).—To pull out.

Herculean Rule-Cutter.—A small but very strong cutting-machine for rules or leads, used in England.

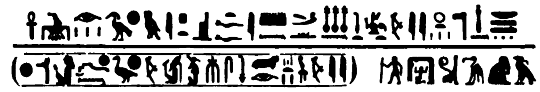
Herhan, L. Stephen, an early inventor of stereotyping, who brought out his process in 1797 in Paris. He had letters made like matrixes, so that when composed the metal could be flowed on them and a perfect plate made. The process proved too costly for general use.

Hiatus.—A defect in the text, by which a word or words may be destroyed, lost or omitted. It may be very extensive.

Hickok, William Orville, a manufacturer and resident in Harrisburg, Pa., born on October 6, 1815, near Warsaw, Wyoming County, N. Y. In 1834 he entered his father's book-publishing house as foreman, and soon began his career as a mechanician and inventor. There were many crude devices with which he was dissatisfied, such as the hand-made pens, and he set himself about improving them. In 1836 he removed to Chambersburg, Pa., and in the year 1839 to Harrisburg, the business in the meantime having passed into his hands. In 1846 he began in a limited way the manufacture of bookbinders' machines and tools. Seven years later he erected a building for himself, and in 1854 the main building, at present occupied by the works which he started, was put up. On July 30, 1886, the business was changed into an incorporated company, Mr. Hickok being president. It is now very extensive. Mr. Hickok died on May 25, 1891.

W. O. HICKOK.

Hieroglyphic.—This word (derived from the Greek *ἱερογλυφικός*, sacred character or engraving) was applied by ancient writers exclusively to the sculpture and inscriptions on public monuments in Egypt, because it was thought that they could be understood only by the priests and those who were initiated into their mysteries; but in modern times the term has been used for any picture-writing. This is, however, inaccurate, as the representations by Indians of the events of the chase or of war can in no case be called hieroglyphic. It seems more properly to apply to those marks drawn originally from pictures, by which events are remembered and thoughts communicated, but which have lost their original form. Thus in German a dagger, †, indicates death, and is prefixed to a notice of decease. In the same way Germans write □ m. for square miles. The Egyptians carried this system of arbitrary signs to a great extent, and as they had no other writing in the beginning it must have puzzled the priests to keep these marks in remembrance. A case came lately under observation where an apple-peddler, who could neither read nor write, kept an account with a number of workmen. One of them, who wore glasses, was indicated in the vendor's book by a drawing of the spectacles, and against this were upright strokes, each meaning a cent. Other workmen had other signs. Thus, in Egypt, particular marks were used to indicate the idea of king or of war. The number of these signs was asserted by Champollion to be 864, of which perhaps some were duplicates. They were arranged in eighteen different classes, of which ten signs were in the first, or celestial bodies; one hundred and twenty in the second, or human figures taken in various positions; and sixty in the third, or human limbs, taken separately. After a long period of time these hieroglyphics were used arbitrarily to represent sounds or letters, and it is believed that the original alphabets of all of the Oriental nations were in like manner representative. A very acute professor of Hebrew in New England, now dead, asserted, and this has generally been taken for granted by other Hebraists, that the original alphabet in that tongue bore a resemblance to the things whose initials they were borrowed from, as ox (aleph), house (beth), camel (gimel), hollow (daleth), and so on. See under HEBREW PRINTING for a complete list. Much attention has been given to the study of hieroglyphics, but it cannot be said that the most learned in this line have acquired the key completely. They are more like the well-informed schoolboy who has taken his Latin lessons regularly being put to translating difficult authors he has never before seen, while he has no dictionary or grammar. In many cases he will be successful, but in others he will make the most egregious blunders.



HIEROGLYPHIC TYPES FROM THE IMPERIAL PRINTING-OFFICE, VIENNA.

High.—Type or blocks which stand higher than the remainder of the form. New type stands higher than that which is worn, but type heated to make newspaper matrixes becomes longer than type not so heated.

High Line.—A term applied to a type which ranges above the rest in a line.—*MacKellar*.

High Quadrats.—Quadrats used in stereotyping or electrotyping which are nearly as high as the type upon which characters are found. They are thus made to prevent the plaster or wax from descending into the hollows between the words, as they would render the removal of the mold difficult and very likely cause breaks.

High Spaces.—Spaces purposely made higher than usual that they may be employed in electrotyping or stereotyping. The space ascends to about eighty-six one-hundredths of an inch in height. These should not be mixed with low spaces.

Hill, Isaac, a celebrated editor and printer. Hill learned his trade in the office of the Amherst Cabinet. He was born in Ashburnham, Mass., on April 6, 1788. In 1809 he settled at Concord, N. H., where he was for many years the editor of the Patriot. In 1830 he was elected to the United States Senate, and in 1837 was chosen governor of New Hampshire, and continued in office by re-election three terms. He was a very skillful politician and wielded great influence in Washington. He died on March 22, 1851.

Hill, Rowland, an English postal reformer. He was born at Kidderminster, England, in October, 1795. In 1833 he was appointed secretary to the South Australian Commission, in which capacity he aided in founding and organizing the colony of South Australia. In 1835 he took out a patent for a press intended to print either with stereotype-plates or movable type, and embodying an improved inking apparatus. It was designed to print a continuous roll of paper on both sides at one operation, which was to be cut up into sheets. Means were also suggested for doing this simultaneously on two rolls, so that two copies could be struck off at one revolution of the cylinders. The machine was actually constructed at the expense of about £2,000, and was for a while in operation; but a difficulty attending the impression of stamps upon every copy, which was then required by law to be done, interfered with its use, and the proper subsidiary machinery also had to be devised. The invention came too soon. Hill's attention was soon after absorbed by his schemes for postal reform, and he paid no further attention to the press.

Hind Posts.—Upright posts at the rear of a wooden hand-press which serve to stiffen it. On one corner was the ink-block; a middle piece served as a support for the bed when it was completely run in.

Hind Rails.—Horizontal pieces of wood fitting at one end into the cheeks of a wooden hand-press and at the other into the hind posts.

History.—One of the chief departments of literature, which furnishes an immense field for all departments of typographical labor. It is a narrative of events.

History of Printing.—An account of the various events which relate to this subject will be found under PRINTING, the INVENTION OF PRINTING, GUTENBERG, FUST, KOSTER and SCHOEFFER, and the names of the particular individuals who have since become famous in the art, as well as under the titles of the various towns and countries where printing has been carried on. Many other headings, also, will afford more or less connected accounts of various events which have happened in the development of the calling.

Hochlithographie (Ger.).—An etching on stone in relief, strong enough to be electrotyped.

Hochzeit (Ger.).—A doublet.

Hoe.—The name of a distinguished family of inventors and machinists who have been engaged in making presses for nearly three-quarters of a century. The original Hoe was Robert, who came to this country in 1803. He was a native of the town of Hose, Leicestershire, England, where he was born in 1784. He was apprenticed to a carpenter, but, attracted by reports of the condition of the workingmen on this side of the Atlantic, purchased the remainder of his time when nineteen years old and came to the United States Yellow fever was prevalent when he arrived, but he found shelter with Grant Thorburn, a seedsman, where he also was attacked with the epidemic. After his recovery he established himself as a carpenter, and shortly afterwards married a daughter of Matthew Smith, of Westchester. He continued as a carpenter and printer's joiner for many years, also making hobby-horses; but soon after his brother-in-law, Peter Smith, invented a printing-press he entered into partnership with him and another brother, Matthew. It was a good press, and the demand increased sufficiently for Hoe to announce himself as a printing-press maker in 1825, both his brothers-in-law having died. About this time Jonas Booth, an ingenious printer, had constructed a power-press, which was in use in New York for printing a Murray's Grammar; Treadwell had invented another, which was employed in Boston, and the Daily Advertiser had imported a third from England. These facts, together with the favorable reports he had from London as to the working of machine-presses, induced Hoe to study their principles carefully, and he began to repair them when called upon. Soon after he began their manufacture, the first press of his make being used on the Commercial Advertiser of New York. About 1830 his health began to fail, and the conduct of business fell into the hands of his oldest son and his nephew, Matthew Smith, the son of his old partner. He died in 1832 at the age of forty-nine. No authentic portrait of him exists.

Richard March Hoe, the oldest son of Robert Hoe, who was at the time of his father's death only twenty years of age, made decided improvements in the business. He enlarged the works on Gold street, bought land at the corner of Broome and Sheriff streets, purchased the Washington press from Rust & Turney, added the manufacture of steel circular-saws to his business, and applied himself sedulously to the improvement of the cylinder press. The type of machine adopted by him was that devised by Napier, the large single cylinder, but it was soon better constructed than it was in England. The genius of Hoe as a mechanic was quickly shown by the improvements he made, and it soon became known that no metal work could be better executed than in his shop. In 1842 he admitted into partnership with himself his brothers Robert Hoe and Peter Smith Hoe, and he applied himself to the construction of the rotary press. This was finally accomplished, and the new machine was put into operation on the Philadelphia Ledger in 1847. The principle of rotary impression was not new. It had been thought of by Nicholson in the last century, had been applied by the Christian Advocate in New York in 1828, and was reinvented by Rowland Hill in England in 1835. Wilkinson had also tried the plan here; but the machines made by Colonel Hoe were practical. They did the work every day, and there was no need of further experiment to remove defects. Their construction preceded by several months the press of Applegath in London, arranged somewhat like it, but with a vertical instead of a horizontal cylinder. It also worked better, as the London Times, for which it was made, discarded Applegath's machines in the end and introduced those made by Hoe. Numbers had previously been made for other English journals. These machines were first made with four cylinders, and those with six, eight and ten were afterwards constructed. All of these were in operation before 1860. See PRESS. Besides these Colonel Hoe had constructed large and small cylinder and double-cylinder presses, and almost all of the tools and implements of the bookbinder's and printer's trades. He also made every variety of wooden implement used in these occupations, this work in 1840 constituting a preponderance of the business, but forming only a small portion twenty years later. The introduction of paper stereotyping rendered possible the introduction of newer and more compact presses, and good advantage was taken of the opportunity. One other American and one English manufacturer succeeded in bringing out machines and availing themselves of this new device before it was adopted by the Hoes; but it proved very successful in their hands. The former swift presses were as tall as an ordinary three-story house in the country, and excited the wonder of the spectator from their size and complexity of parts; the new could be put into a bachelor's hall bedroom. The number of attendants was greatly diminished, as the later machines were fed by a web. See WEB PRESSES. Many other devices were originated or perfected by Colonel Hoe. Shortly after the close of the Civil War the establishment removed from Gold street to the corner of Broome and Sheriff streets, where a fine manufactory had been erected, covering an entire block. In 1859 the manufactory of Adams presses in Boston was bought, and about the end of the war works were begun in London. The last years of Richard M. Hoe's life were occupied in collecting a library on typography, which was, however, dispersed after his death. This happened on June 7, 1886, in Florence, Italy, while traveling for pleasure. He will long be remembered in New York as a kindly, whole-souled man, having great ability in his calling, and of sterling worth. A marble bust of him is in possession of the New York Typothetæ. Peter Smith Hoe is now the only one of his brothers living. Robert Hoe, a son of Robert and grandson of the original Robert, is a well-known book-collector, and was one of the founders and the first president of the Grolier Club.

RICHARD M. HOE.

Hoe Press.—The name of a large number of presses manufactured since 1823 by Robert Hoe and his sons, grandsons and successors. At first these were wooden presses and the Smith and Rust presses, the last better known as the Washington. About 1828 they began making machine-presses on the Napier model; in 1833 the double Napier press, and in 1847 the type-revolving press. Later improvements have been the stop-cylinder and the web perfecting press. Some of the distinctive features of these presses will be mentioned under the articles PRESSES and WEB PRESSES. A very great variety of machinery is now manufactured by this house.

Hoffmann, François Ignace Joseph.—An inventor of a system of stereotyping in 1783 called polytypy or logotypy. Hoffmann made a matrix of clay and plaster-of-paris, mixed with gum and potato starch; his experiments continued until 1793. He was an Alsatian by birth.

Hoja, Impreso en (Sp.).—A sheet printed on one or both sides.

Hojas de Guarda (Sp.).—Fly-leaves of a book.

Hojas de Lata (Sp.).—Strips of tin, in the form of leads, used in making register on the press.

Holbein, Hans.—A celebrated painter of the sixteenth century, who was also noted for his masterly engravings upon wood. It is not known exactly when he was born or where, but the date has been placed between 1495 and 1498, and most biographers believe that the place was Augsburg. Holbein's reputation as a wood-engraver is chiefly founded on a series of illustrations known as the Dance of Death. He died of the plague in England in 1554.

Holds Out or **Not Holds Out.**—These terms are applicable to the quires of white paper, to wrought-off heaps, to gathered books, and to sorts of letter. If quires of white paper have twenty-five sheets each in them they say the paper holds out five and twenties. Of wrought-off heaps, the heap that comes off first in gathering is said not to hold out. Of gathered books, if the intended number of perfect books are gathered they say the impression holds out; but if the intended number of perfect books cannot be gathered off the heaps they say the impression holds not out. And so for sorts of letter.—*Stower.*

Hole.—An ancient term for a private or unlicensed printing-office. This very expressive word gives a good description of the place where such work was executed. It must have been in a room which would not be likely to attract attention; it could not have been on a thoroughfare or other open space. Windows must be closed, space was small, the work hurried, and the men must have often slept there. Later this term was applied to places where obscene works were printed.

Holland.—This is the name usually given by English-speaking people to the country known to the French as the Pays-Bas and to the Germans as the Niederlande. Holland, or the Netherlands, is located in the westerly part of Europe and borders on the North Sea. It has been asserted by some people, and it is still claimed by many, that printing was invented in Haarlem, Holland, before 1440. The earliest work to which a date is attached is in 1472. After Holland had secured recognition of her independence from Spain the press was very productive. The first improved manual press was by Blaew of Amsterdam, and the types cut at Haarlem and elsewhere maintained for years a superiority over those of the remainder of Europe. English printers were supplied with their best fonts from Holland until Caslon arose, and the famous family of printers known as Elzevir will be remembered as long as typography has an existence. Amsterdam is the chief centre of the book trade, as well as of newspapers. Some years ago Holland had, with a population of three and a half millions, 367 hand-press printers and 98 steam-printers, with 153 manufacturers and wholesale dealers in paper. There were eighty-seven bookbinders and ten map and chart publishers.

Holländern (Ger.).—To paste the sheets of a book together on the back, using no sewing or other binding to keep them together.

Hollow Quadrats.—Pieces of type metal so cast that in the centre there is a round or oval space. Where the curve most nearly approaches the centre of the sides the wall between is very thin. They are much used as frames or chases for miniature job-work.

Holt, John, an early printer of New York city, was born at Williamsburgh, Va., in 1721. Failing as a merchant, he went North, and in conjunction with James Parker published the Connecticut Gazette at Hartford in 1755. After a time he went to New York, becoming the publisher of the New York Gazette, which was the boldest in tone of all the newspapers in that city, opposing the acts of the king's advisers strenuously. The Journal was the name of a paper of Holt which succeeded the Gazette, in which he had no proprietary interest. In 1770 Holt established a press at Norfolk, Va., which was seized by Lord Dunmore in 1775 on account of its revolutionary doctrines. Holt's New York Journal was published until 1776, when the British occupied the city; it was then issued at Esopus and Poughkeepsie. He was the printer to the State during the Revolution. After the war he returned to New York, obtained a new face of type and printed a semi-weekly paper. He died on January 30, 1784. His wife continued the newspaper, which was sold in 1787 to Thomas Greenleaf.

Holzschneidekunst (Ger.).—The art of wood-engraving in all of its forms.

Holzschneider (Ger.).—Wood-engraver.

Holzschnitt (Ger.).—A wood-cut.

Hombro (Sp.).—The shoulder of type.

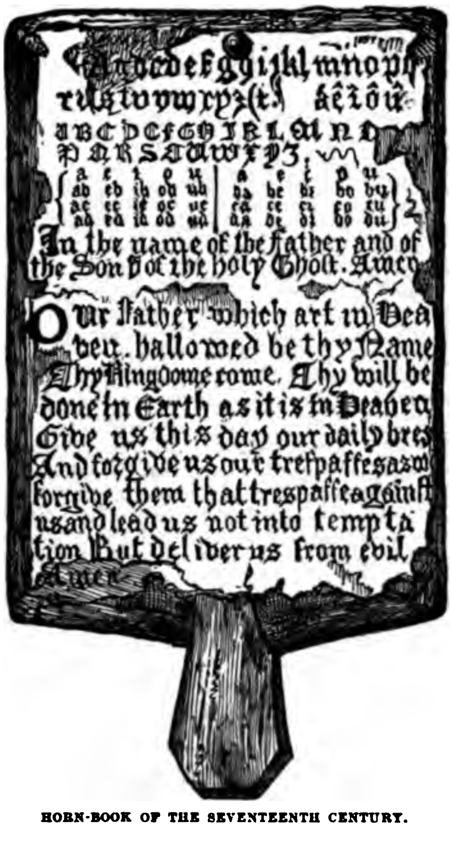
Home for Union Printers.—By the liberality of George W. Childs and Anthony J. Drexel of Philadelphia, who each gave $5,000 to the International Typographical Union, a home for printers was established by that organization at Colorado Springs, Col., eighty acres of ground having been given by residents of that place for this purpose. Mr. Childs, who had previously made many benefactions in a modest way for the relief of the craft, determined in 1886 to give a considerable fund for any object which they might deem desirable, and was joined in this by Mr. Drexel. The money was allowed to remain at interest, while each year the union printers gave the value of a thousand ems of type. At the session at Denver in 1889 it was resolved to use this fund for the establishment of a home, and Colorado Springs was chosen as the place. The construction of the building and the preparation of the grounds occupied about two years. It was formally opened by Mr. Childs on May 12, 1892, addresses also being delivered by James McKenna, the vice-president of the International Typographical Union, and Jacob H. Gallinger, United States Senator from New Hampshire, who was formerly a journeyman printer. There was a very large attendance at the opening ceremonies, including many officers and members of the Typographical Union and the members of the National Press Association. The building is four stories and basement in height. A square tower projects from the building at the south and a round tower at the north end. These towers rise one hundred feet above grade. The structure is one hundred and forty-four feet long by forty-four feet wide, with a wing twenty by forty-four feet, and is built of gray lava stone with red sandstone trimmings. There are sixty-three rooms, and some of them have been furnished by various unions. The total money paid out was $66,916.44. The receipts for the home have been $79,823. There is, therefore, a surplus on hand of $9,708.56, after deducting one unpaid bill of $3,198. A number of gifts have lately been made towards the purposes of this institution by the employing printers of the large cities, principally for a library, and it is supposed others will join in this movement.

Hook Up.—The end of a line turned over and bracketed into the line above.

Hooker, John.—An Englishman who invented a typesetting-machine of much merit. He was a manager in Clowes's printing-office. In his machine electricity is used to communicate between the key-board and the type-channels; distribution is done by hand.

Hopkins, George Folliott, an early printer of New York, was born at Amenia, Dutchess County, N. Y., on June 1, 1770. It is supposed that Hopkins learned the printing trade at Hartford, as he was first known in New York in 1795 in conjunction with Noah Webster, the lexicographer, who had previously resided in Connecticut. He was the publisher of the Minerva, the Federalist organ, and speedily attained the highest reputation as a printer of taste and correctness. Dr. John W. Francis declared that for many years in New York almost all manuscript works were executed either by Hopkins or Jonathan Seymour, who was in partnership with him for a portion of the time. About 1825 Hopkins sold out his printing-office and went to the West, but soon returned, having been unfortunate. He continued in business, the last few years in a smaller way than formerly, until about 1845, when he removed to his farm near Rahway, N. J., dying there on August 9, 1848. He was twice married, one of his daughters being the wife of George Pope Morris, the poet.

Horn-Book.—A contrivance which existed before the invention of printing and which was designed to provide an indestructible school-book for boys. The horn-book was a small broadside made up of the alphabet at the top, in capitals and small letters, a list of the vowels, a number of the commonest syllables, and the Lord's Prayer. This single leaf was set in a wooden frame, fashioned with a handle at the bottom like a lady's hand-glass. In the handle there was a hole for a string so that the horn-book could be slung to the school-boy's belt. Covering the printed sheet, and protecting it from the boy's destructive finger-nails, there was a plate of horn shaved down thin enough to make it perfectly transparent. Sometimes the printed sheet was simply pasted on the plate of horn.


In the name of the Father and of
the Son & of the holy Ghost. Amen
Our Father which art in Hea
ven. hallowed be thy Name
Thy Kingdome come. Thy will be
done in Earth as it is in Heaven
Give us this day our daily bre
And forgive us our trespasses as w
forgive them that trespasse against
us and lead us not into tempta
tion But deliver us from evil
Amen

HORN-BOOK OF THE SEVENTEENTH CENTURY.

Horquilla (Sp.).—The fork, a piece in stop-cylinder and other presses which detains the cylinder at the moment of gauging the sheet.

Horse.—The stage on the bank upon which pressmen lay the heap of paper. See BANK.

Horses.—Pressmen were thus called on account of the arduous and exhausting character of their labor.—*Stower.*

Horsing.—Charging for work before it is executed. Dead horse, money thus obtained which must be paid back. Horsing it, to read proof without a copy-holder.

Hose.—In a wooden hand-press, the box which surrounded the spindle or screw and held it in a perpendicular position. It was itself held in place by being inserted in the till, a shelf extending from one upright post to the other.

Hose Hooks.—Hooks fastened at the lower end of the hose or box in which the screw of a wooden hand-press turns. They fit into corresponding hooks on the top of the platen, and serve to keep that suspended.

Hot Pressing.—A mode of pressing by means of hot plates laid at intervals between the ordinary pressing-boards and placed in a powerful press. This gives a high polish to the paper and ink. It is now rarely resorted to in America, as the object is attained by dry printing with hard packing. It seems to have been invented by Baskerville in the last century, and was in use in New York and Philadelphia as early as 1802. See WAREHOUSING.

Hot Rolling.—A mode of rolling by means of heated cylinders which both dry and press the work at the same time. See GILL'S HOT-ROLLING MACHINE.

HENRY O. HOUGHTON.

Houghton, Henry Oscar, a distinguished printer of Cambridge, Mass., was born at Sutton, Vt., on April 30, 1823. He entered the printer's calling at Burlington, in that State, and remained in that town until he had learned all that his employer could teach him. He was subsequently employed at Nunda, N. Y. Returning to Vermont he entered the University at Burlington, and four years later, in 1846, was graduated from that institution. He then attempted to find a place as a teacher, but failed, and went to Boston, there setting type in the day time and reporting lectures and speeches in the evening. He accepted a proposition made by a friend to join in a printing venture at Cambridge in 1849, the firm being Bolles & Houghton. After Mr. Bolles retired, three years later, Mr. Houghton removed the printing-office to its present location, and named it the Riverside Press. The accuracy and pains displayed in composition, with the evenness and regularity of presswork, soon gave him a good reputation, and the establishment speedily required enlargement. In 1864 he became a member of the firm of

Hurd & Houghton, book publishers, with offices in New York and Boston. It afterwards became Houghton, Osgood & Co., and later Houghton, Mifflin & Co. Mr. Houghton has been mayor of Cambridge and president of the Boston Master Printers' Club, and is an honorary member of the New York Typothetæ.

Houghton, Thomas Shaw, author of the Printer's Every-Day Book, died in Southport, England, in 1871. His book, published thirty years before, had considerable value. It had an account of how newspapers should be made up, and gave the first hints for labor-saving furniture, rules and leads.

Hours.—1. Pressmen once counted their work in tokens of 250 sheets as hours. This usage, however, went out long before hand-presses were superseded by power-presses. It gave too high a standard of performance, for few pressmen could pull and few could beat as fast as this, even on one-pull presses. With two-pull presses, of course, the difficulty was increased. It is not probable that many pressmen ever made a practice of exceeding 2,000 pulls in a day of ten hours. 2. Prayers in the Roman Catholic Church, appointed to be said at certain hours in the day. Those written and painted for great ladies, kings and noblemen were the most skillful productions of the day. They were enriched with miniatures, landscapes, representations drawn from the Scriptures or from popular hagiology, and were bound with exceeding care. Fine examples even now bring great sums. 3. Compositors reckon their lines when working in companionships by hours, according to the size of the type and its measure. Not used in America.

House Marks.—Corrections in proofs which the piece-hand is not expected to execute.—*Jacobi*. Such marks are known in America as office marks.

Howe, George, proprietor of the Sydney Gazette, who introduced the art of printing into New South Wales. He was born in St. Kitts, in the West Indies. He went to New South Wales in 1800, and shortly afterwards induced the authorities to send for type and a press to London. When they reached there he took them in charge and brought out the Gazette on March 5, 1803. The colony was then fifteen years old. He had great difficulties in getting supplies or in repairing any accident, as he was six months distant from London, and a letter would not be answered under a year. A strict censorship was also established, his proofs frequently being marked so as to be unrecognizable. He died on May 11, 1821, being then fifty-two years of age.

Howe, Joseph, the son of a Loyalist editor who emigrated from Massachusetts to Nova Scotia during the Revolutionary War, was born in Halifax on December 13, 1804. When he was thirteen he began to learn the printer's trade, and in 1827 became part proprietor of the Weekly Chronicle. The next year he was sole proprietor of the Nova Scotian. He was elected to Parliament in 1836, and became in 1840 a member of the Provincial Cabinet. He was a man of great influence, a fine orator, and the leader of his political party. In 1863 he became premier. When it was proposed to have Nova Scotia enter the Dominion of Canada as one of the confederation he opposed it with all his strength. After it was accomplished he became president of the council and afterwards secretary of state. He died in Halifax on June 1, 1873.

Hub.—Each of the projecting thick bands on the back of a blank-book.

Huber Press.—A series of presses made at Taunton, Mass., comprising a two revolution, two color and perfecting press. In the latter the sheet is fed at one side, and passing between the bed and one impression cylinder receives the impression from the first form; it is then taken by the grippers to the other impression cylinder and carried up between the two cylinders and around between the bed again, where it receives an impression from the second form upon its opposite side. There is an offset apparatus to diminish the chance of injury by the transferring of ink from one side to the other. To all these presses there is an easy reversal and very little jar.

Hudson, Frederic, the author of a History of Journalism, was born at Quincy, Mass., in 1819. He early went to New York, becoming connected with the New York Herald and advancing by successive steps from the lowest rounds of the ladder until he became managing editor. He occupied that position during the Civil War. He retired on a pension shortly afterwards to Concord, and there wrote his Journalism in the United States from 1690 to 1872. It contains many facts otherwise inaccessible, and is distinguished for accuracy and fair-mindedness. He died in Concord on October 21, 1875, in consequence of an accident.

Hueca (Sp.).—A term applied to broad-faced type.

Huella (Sp.).—An impression which shows on the back of a sheet when printed.

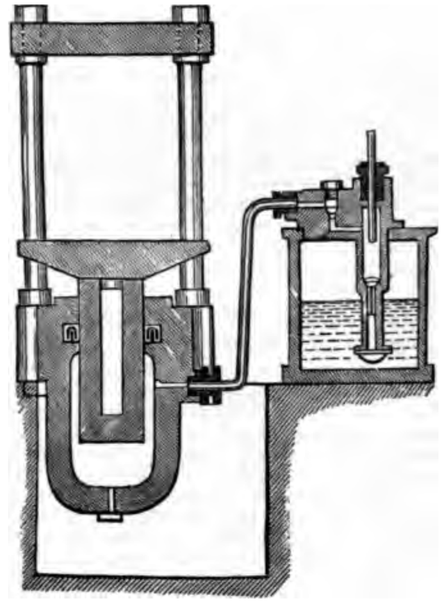
Hughs, John, a printer of London, born at Thame, Oxfordshire, in 1703. He received a liberal education at Eton College, and served a regular apprenticeship to a printer in London. Hughs began business for himself in 1730, and ranked for years very high in his profession. About 1763 he obtained, through the influence of Lord North, who had been his school-fellow at Eton, the appointment of printer to Parliament. He died on September 30, 1771, and was succeeded by his son Henry, who retired in 1799 and died in 1810. This house was the predecessor of that of Hansard.

Hungary.—A country in the middle of Europe, politically annexed to the empire of Austria, and from which the emperor derives the lesser of his two titles, imperial and royal. The language is unlike all others in Europe west of Turkey, and belongs to the Tartar group. In its earlier years Hungarian was not cultivated, all records and letters being in Latin, and that tongue was employed for all public purposes and as the language of parliament and the universities until 1848. Nevertheless, there is a large body of Hungarian literature, mostly the creation of this century and the last. Many books are now printed in Magyar. There are now more than 600 Hungarian newspapers, 267 of which are published in the capital, Budapest. Besides these there are 181 magazines and newspapers printed in foreign (not Magyaric) languages within the kingdom.

Hurenkind (Ger.).—A line which runs over, ending a paragraph on two, three or four letters, something which is always forbidden in good houses.

Husillo (Sp.).—The spindle of a hand-press.

Hydraulic Press.—A machine in which the pressure of a piston on a body of water of relatively small sectional area is made to propagate the force to a cylinder of multiple area, where the force is directly as the difference and the speed inversely as the difference. It is also known as the hydrostatic press. A press operating on this principle is used in printing-offices and bookbinderies, as well as in almost all other places where great and steady pressure is required. This powerful engine was first suggested by Pascal, based upon the hydrostatic principle of fluidity, or that property by which water and other fluids are capable of transmitting pressure equally and freely in every direction. A hydraulic press consists essentially of two parts. One is a cistern, or large column of water, to which communication is given by a pipe to a smaller cylinder, in which there is a plunger. The plunger is moved by power, and drives the current of water before it into the larger reservoir. Every square inch of the ram at the top is acted upon with the same force that is imparted by each square inch of the plunger. But as the ram is larger than the plunger, the force thus exerted is greater. If it is four times as great in diameter it acts with sixteen times the force, and if thirty times the diameter with nine hundred times the force. The ram, of course, ascends very slowly. A valve prevents the outflow of the water when the plunger rises for another stroke. In 1796 Bramah, a distinguished engineer in Great Britain, made the hydrostatic press available. It is much stronger and more compact than any screw or lever press, and requires no laborious work in unscrewing, which in some other presses is almost as difficult as to apply pressure at first.



HYDRAULIC PRESS.

Hygiene.—See HEALTH.

Hymn-Book.—A volume containing the hymns used by a religious society. These are usually on small pages with narrow margins, and are printed compactly so that the expense may be small. These books, prayer-books and Bibles are the only works having large editions with small pages. It would be well, therefore, on the smallest if four pages should be electrotyped together, with their proper margin. There is less danger of their being out of register.

Hyphen.—The mark of division and also of union. It is a very short dash, used at the end of a line to indicate that a portion of a word has been carried over to the next line. In good newspapers it is forbidden to divide a word of four letters, such as up-on, for the reason that care in spacing would either drive out the first part or take in the second, and in book offices the same rule is applied. Many persons carry this prohibition much further, not allowing divisions of less than six letters, and that not with two letters on one side, as in be-side; others allow none where the original word cannot be divided in the singular, and think that no difference should be made where there is a plural, as in rider or rid-ers. Such a division as hors-es is, of course, inadmissible anywhere. Some forbid divisions which do not look well, as lev-ying, on the ground that y as a separate syllable ought never to begin a line. See DIVISION. The more strictly such rules are kept up the more difficult it becomes to space evenly, and Harper & Brothers, seeing the embarrassment that their men sometimes experience, allow divisions consecutively for many lines. Usually, however, printers forbid more than two lines to be divided in succession, and nearly all forbid more than three.

Books have frequently been brought out with very few divisions, and sometimes having none at all. It is possible on measures of twenty-five ems and over to avoid divisions entirely, excepting perhaps on the first line of a paragraph, and even then it may be escaped if a friendly editor or author will change or transpose a word. The longest word of one syllable in English is strength, which takes about three ems. It may come in such a place that no more than streng can get in, which would involve for spacing out perhaps two ems, for the preceding space must be counted. Taking, therefore, on good bookwork two thick spaces as the extreme which can be used by the compositor in any one place, it would require seven words to avoid this, which in a measure of twenty or twenty-two ems it is often difficult to secure. A word may be borrowed from a preceding line to help out, but this cannot be done at the beginning of a paragraph. It is totally inadmissible to thin space between letters to drive out a word; even in very narrow measures, with run-in cuts, it should be carefully avoided. It is said that Tom Jones was reprinted in Paris in 1780 by Didot, and that there was not a single division in the whole work. It was in English, and the editor, Berquin, knowing that the rules for division in that language were not the same as in French, resolved that he would shock no English readers and would put it out of the compositor's power to err. He therefore gave orders that not a single word should be divided, and this rule was followed out. Brun, a well-known writer on typography in French, brought out his book on this subject without divisions, and Munsell did the same with one of his books.

A second very important use of hyphens is in COMPOUNDING, which see. This is not done as freely as in either French or German, but it is frequently carried to a ridiculous extent. There is a foreign usage of the hyphen which may be defended on grounds of reason, but although educated printers have been familiar with it for thirty years or more, it has not yet gained much currency in America. It is the practice of putting a hyphen after a word which would take it if it immediately joined a word with which it would make a compound, as in "short- or long-lived persons," "wood- or steel-engraver," &c. Hyphens are sometimes used for leaders, separated by em or two-em quadrats. But while they look well, they are apt to be crushed, and are also likely to penetrate the paper. Hyphens should be a four-em space or a thick space in width, but are sometimes cast by founders on en sets for figure work. About half of one per cent. of all the letters of a font are hyphens. This character cannot be used to lengthen an en dash and make that available for an em dash. In German, where a hyphen is used to indicate compounding, Bachmann declares that a thin space is necessary on each side.

I

I THE ninth letter of the alphabet. As a capital it is a straight line with a serif above and below, and as a lower case it is distinguished by having a dot over it, the only letter which has one, except j. These two letters, in fact, were identical for a long time, and when they were differentiated from each other it was done by making the consonant i longer than the vowel i, and the capital consonant I with a little curve at the bottom which the vowel did not have. In dictionaries these two letters were treated as one until after the first quarter of this century, and in some works this confusion is still carried on. In a Latin religious book, printed in Belgium since 1880 for the use of the pious, ejus appears as eius and jacet as iacet. In the upper case J does not appear by the side of I, but is transposed to the place where the twenty-fifth letter of the alphabet should be. It is preceded by X, Y, Z. In the lower case i is among the most-used letters. It is as thin as any alphabetic letter, and the capital I is the thinnest capital. The lower case varies setwise from a fourth to a third of an em, and the capital from two-fifths to one-half. The manuscript letter for the capital is very misleading. In many persons' penmanship the two are exactly alike, although there are a great number who extend the bottom stroke much below the line. Where the writer confounds the two, or where no other J occurs, it is better to construe them thus in initials than as I. Three or four of the commonest first names begin with J, such as John, James and Joseph, while comparatively few take I.

Ibarra, Joachim, printer to the King of Spain, who carried the typographical art to a degree of excellence unknown in that country before his time. Ibarra was a native of Saragossa, where he was born in 1726. His presses produced fine editions of the Bible, the Mazarabic Missal, Mariana's History of Spain, Don Quixote, and Grabrial's Spanish translation of Sallust. He invented a superior kind of printing-ink. Dr. Franklin speaks in terms of high commendation of him. Ibarra died in 1785.

Icelandic.—The language of the people of Iceland. The type of Icelandic is very nearly the same as that of Swedish or Danish. The Saxon th and the œ form two additional letters. Formerly the black-letter characters were used, but now the custom is to use the Roman letters. Runic characters were employed before the introduction of Christianity, about the year 1000. The language itself is the oldest in Western Europe. It is a member of the Scandinavian family, but is far more richly inflected than Danish or Swedish, having altered very little since the dawn of history. Little printing is done in Icelandic, as the whole population of Iceland does not exceed 65,000. There are three or four newspapers. Printing was introduced into Iceland in 1531, when a breviary was printed at Hoolum from types rudely cut, it is alleged, in wood. In 1574, however, metal types were provided, and several works were brought out. After a period of decline printing was revived in 1773.

Iconotype.—An American process, invented by William Brah of Milwaukee, for engraving an intaglio or sunken drawing in a transparent ground on a transparent base over the original drawing, which can then be electrotyped and used for typographical printing.—*Caspar.*

Idaho.—The name of one of the United States. In 1870 seven and in 1880 ten newspapers were published in Idaho, the earliest then living having been founded in 1864. Newspapers there, as everywhere else in the West, preceded all other attempts at printing. In 1890 thirty-eight newspapers were issued. Boise City, the capital, is the chief town.

Igualar Punturas (Sp.).—To equalize the points so that margins shall be equal.

Illinois.—The name of one of the States of the American Union. Printing was introduced into Illinois in 1815 at Kaskaskia by Matthew Duncan. In Chicago a newspaper was published in 1833 by John Calhoun. It was entitled the Chicago Democrat. Springfield published a newspaper in 1827, Peoria in 1834, and Galena in 1828. The total number of periodicals issued in 1840 was 43; in 1850, 107; in 1860, 286; in 1870, 505; in 1880, 1,017; and in 1890, 1,309. Of these 111 were daily, 1 tri-weekly, 20 semi-weekly, 938 weekly, 5 bi-weekly, 32 semi-monthly, 190 monthly, 4 bi-monthly and 8 quarterly. Illinois stands second in number of periodicals among the States of the Union, but in the number of copies issued is third, being exceeded by both New York and Pennsylvania. Besides Chicago, the chief centres of population and printing are Alton, Aurora, Belleville, Bloomington, Cairo, Decatur, Joliet, Peoria, Quincy, Rockford and Springfield. Combined, however, these smaller towns would not make a respectable second to Chicago, which monopolizes the trade and news of that section to an extent unknown elsewhere in the Union. Most of the printing-offices and newspapers in the State outside of Chicago are small; the latter are generally printed on the auxiliary plan, and the drummers of Chicago take away a very large proportion of the printing which might otherwise be done in the local centres. The amount of business in Chicago is enormous. In newspapers it only falls behind New York and London, and in printing behind them and Philadelphia.

Illumination.—The decoration formerly employed at the beginnings of books or chapters, or whole pages, consisting of paintings, frequently in the most brilliant colors. The term illuminated is derived from the use of minium for a red color by the artists; hence called miniatores or illuminatores. Gilding of two kinds was also employed, flat and raised or embossed. A great variety of colors were used in conjunction with the gilding. Occasionally something of the same kind is attempted now, but the multiplicity of times the form must go on the press raises the cost of the work to such a degree as to practically forbid it.

Illustrated Newspapers.—Illustrations have always been used by printers, but from the difficulty of printing them properly in a short time they were little employed on newspapers until within the last half century. The first attempt in English which continued was in Punch in 1841, although the Penny Magazine, a periodical giving information somewhat in the style of a popularized cyclopædia, had used illustrations largely from its beginning in 1832. This magazine was reprinted in America; but it was not until the Illustrated London News was established in 1843 that it could be said that illustrated journalism had begun. The first of these periodicals in the United States was Gleason's Pictorial, published in Boston about 1850. Frank Leslie's began in 1854, and Harper's Weekly in 1857. The magazine published by Harper & Brothers, begun several years before, had been quite freely illustrated. Since that time many newspapers have relied chiefly upon their pictures for their sale, including among them one daily paper, the Graphic, and many have freely used illustrations, though not placing so much stress upon them. When process cuts were so made that they became available the daily papers began to use them and have kept up the practice. Wood-engraving is little employed on newspapers, except on those with the most means, as process illustrations cost very much less. It is possible, for instance, to get a fair, cheap portrait suitable for a newspaper for two and a half dollars, if process work is used; five dollars will get a good one. The cheapest price for which a wood-cut of this kind could be made is about eight dollars; but for first-rate small portraits Harper & Brothers and the Century Company pay from thirty-five to fifty dollars. A portrait on wood, covering an octavo page and engraved by a first-rate artist, is worth two hundred dollars. Under these circumstances it is easy to be seen what an immense advantage process engraving has over the other method. Another advantage is the swiftness with which it can be executed. Its demerits are that it requires a smoother paper, is frequently shadowy and indistinct, does not define certain lines with clearness enough and cannot be accentuated. In every painting or drawing of merit something is left out, something emphasized; but nature copies defects as well as beauties; therefore illustrated papers, like the Scientific American, which show machinery, are almost entirely dependent upon wood for their engravings.

Illustrated newspapers require a good and smooth paper. If process engravings are to be used, a very smooth paper. The articles are so written that illustrations can be employed, and frequently the only reason for the article is that the engravings may have some illustrative text. Wood-engravings, when required to be done with speed, are sketched on a block of the right size. This consists of sixteen, thirty-two, forty-eight or sixty-four pieces clamped together. The moment the sketch is done in its main features it is divided among as many artists as can be employed on it, each taking a section. When they are done each engraver takes a block and finishes it up, the most important parts being confided to the best engravers. When all the parts are completed they are again clamped together and are ready to be printed from or to be electrotyped. They are rarely printed from the wood, as the blocks would very soon be destroyed. Usually speaking, when colors are employed, the form must go on the press as many times as there are colors. Engravings should be separated at some distance from the text in order to give them their full effect, and every one should be carefully squared and trued up. Column rules should not be pieced in an illustrated paper. All lengths should be on hand. Reglets and long leads and slugs are also required. When the form is worked off, if wood-cuts have been employed, the type should not be washed until they have been taken out and the space filled up. Then washing can be done. A regular storage system should be adopted for cuts, for many will be required again. A portrait of Queen Victoria, for instance, might be occasionally available for the next fifty years. Lithography does not answer well for illustrations in newspapers. The pictures have too little detail and appear coarse. Presswork must also be done a second time. See under ENGRAVING, PROCESS PRINTING and WOOD-ENGRAVING.

Illustration.—To decorate a book, job or newspaper by engravings. This has become very common since the discovery of process plates, and it bids fair to become still more common. Illustrations may be made by relief or in intaglio, or by lithography. Each of these processes is described under its separate head. Sometimes the illustrations are printed in one or more colors other than black.

Pains should be taken to adapt engravings to the kind of paper which is to be used and to the method of printing. It is impossible to print a lithograph with as many clear and distinct lines as can be given by wood-engraving, and that again cannot be as minute as by the photographic processes. The extreme of clearness is reached by steel-engraving, for while process lines may be as close together and as fine, they cannot be varied as well as in steel, nor can unnecessary lines be omitted if the engraving is in half-tone. In color-printing much depends upon the background and upon the condition and quality of the inks. Illustrations, as a rule, require better inks and more rapid drying inks than letter-press work, as there are places where the color is massed to form a solid bit of black. Such drying inks are made by all manufacturers. Illustrations in colors, where it is not necessary to have a fac-simile of nature, can be printed in four, five or six tints sufficiently near to the truth for all practical purposes. Toy-books for children, illustrations for comic newspapers, like Puck and Judge, and ordinary labels are thus executed. Some only require three colors.

Imitation Morocco.—A leather sometimes known as French morocco, and made from sheepskin. It is of both German and French manufacture. The latter is the best and is used in hand-work in full binding, for the sake of economy, in the place of Turkish morocco. The leather is elaborately stamped to hide imperfections and is a fair imitation of the Turkish leather.

Imitation Parchment.—Paper chemically treated so as to resemble parchment. It is dipped into sulphuric acid somewhat diluted, and then passed through a dilute solution of ammonia, and immediately becomes changed in almost all of its qualities, resembling leather more than paper. It becomes tough, hard and fibrous without alteration in weight. It gives a writing substance far better than animal parchment, and has been largely used on this account by architects and engineers for their plans. It takes oils and varnishes freely. It bears rubbing better than any kind of paper, and almost as well as sheepskin. It serves as a substitute for vellum in bookbinding; as a material for policies, certificates, &c.; it is a strong paper for school-books, and as covering for jars and bottles of various kinds is excellent. Ordinary paper, even after being printed upon, can be converted into this vegetable parchment. It is also made waterproof. Photographs can be made upon it.

Imitation Vellum.—A paper made to resemble vellum, prepared in the same manner as imitation parchment, but thicker.

Impaginatore (Ital.).—He who makes up the pages on the galleys.

Imperfect Paper.—Reams of paper not made up to the full number of a printer's ream. Hand-made, drawing and writing papers are sometimes imperfect and run a few sheets short.

Imperfections.—1. When type comes from a foundry there are frequently many letters short. These must be cast, and are called imperfections, because the font was imperfect without them. Different kinds of work run to different sorts, however, and it is idle to expect that the whole of a font can be set out evenly, so that until the letter is entirely worn out sorts must from time to time be purchased. 2. Sheets rejected on account of being in some respects imperfect, and for which others are required to make the work complete. 3. Sheets required by a binder to make good the books which are imperfect through bad gathering, collating or spoiled sheets.—*Jacobi.*

Imperial.—In England, a size of printing-paper 30 by 22 inches; writing-paper, 34 by 22 inches. In America, writing-paper, 22 by 30, but occasionally 23 by 31; printing-paper, 22 by 32.

Imperial Cap.—In England, a size of brown paper 29 by 22 inches.

Imperial Press.—A hand-press used in England, invented by Messrs. Sherwin and Cope many years ago.

Imponer (Sp.).—To impose (forms).

Imporre (Ital.).—To impose.

Imposición (Sp.).—Furniture (for imposing).

Imposing.—Arranging and locking up a form of type in a chase.

Imposing-Beds.—A bed of stone upon which forms are imposed or laid. Sometimes these are of iron. In Germany forms are usually imposed upon letter-boards, laid upon tables.

Imposing-Iron.—An imposing-bed made of iron. Thus used in England. It is called an imposing bed, table or stone here, the actual material of which it is made not being considered.

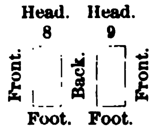
Imposing-Stone.—The stone on which compositors impose or place forms. Also said of metal plates or slabs used for the same purpose, although incorrectly. A stone should be at least two inches thick, and the best quality used in America has been of Italian marble. Within the last twenty years, however, it has been discovered that other marbles are just as good. Slate has been somewhat used for this purpose. Stones should be mounted in firm wooden frames, perfectly horizontal, and after being laid should be secured in their supports by pouring plaster-of-paris around the edges. The surface of the stone should be a quarter of an inch or so higher than the frame; this facilitates sliding matter on or off a brass galley without difficulty. The surface should be perfectly smooth. If after long usage it becomes rough the face should be reground.

Imposing-Surface.—Another term for imposing-stone.

Imposition.—The art of laying down pages so that when locked up and printed they will come in a regular consecutive order in the printed and folded sheet, with the appropriate margin. LOCKING UP, MAKING UP, MARGIN and SIGNATURES are separately treated. Little more than the order of pages will be discussed in this place. The various sizes of sheets are a single page, a single page and its backing, and four, eight, twelve, sixteen, eighteen, twenty, twenty-four, thirty-two, thirty-six, forty, forty-eight, sixty-four, seventy-two, ninety-six and one hundred and twenty-eight. One page is known as a broadside, four as a folio, eight as a quarto, sixteen as an octavo, twenty-four as a duodecimo; the other sizes are called by the number of leaves, as 16mo, 36mo, 96mo. Duodecimo means twelve leaves, octavo eight leaves and quarto four leaves, of course in each case with twice as many pages. At present forms are generally worked with all of the pages intended to perfect that sheet on one side. After as many impressions have been made as are desired the sheet is turned over and the same form is worked on the other side. This is called the half-sheet method, and is often spoken of as work and turn; but it will occasionally happen that only the pages which are to appear on one side of a sheet are to be printed at once, as in a newspaper, where the fourth and first pages are printed together. When this is finished the form is taken off and another is put on having the second and third pages. When this impression is completed that sheet is done. Many newspapers are thus printed, and this frequently happens in job-work; but few books are executed in this manner in the United States. Multitudes are thus worked abroad. By the half-sheet method a complete sheet is printed at each impression, and two when both sides are worked; but by the other method only half of a sheet is printed at one impression. It still needs to have the other side printed. In books with cuts, when it is desirable to let one side of the paper dry before working the other, pressmen here nearly always print sheetwise.

Still another method of imposition is that known as the leaflet, much favored by railroads. In these pamphlets the folding is effected in such a way that one page reads consecutively after another, the back of one leaf being the outer margin of another. Neither the rule that the two pages alongside of each other must add together more than the total number of pages in the form nor the other rule about the addition of pages heading together applies. They are without law. Folding-machines have also peculiar ways. When it is known that a book a little different from ordinary is to be folded on one of these machines it is well to get from the binder a sheet marked as he desires the pages to be laid. Otherwise, while correctly imposed, the method will not be that most convenient for the machine.

The four sides of the pages are known respectively as the head, foot, front and back, the head being that part which stands at the top of the leaf, the foot at the bottom, the front, if an odd page, at the right, and if even at the left of the leaf, when the book is opened, and the back at the reverse side from the front or between the two pages. This may be thus shown, the pages not being reversed, but as the reader sees them:



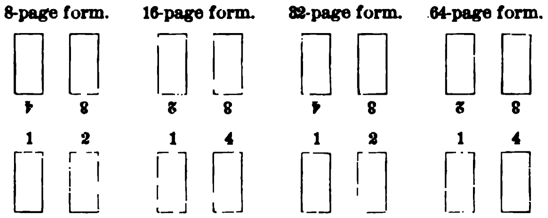
1.—MARGINS OF A BOOK.

These two pages form one side of two leaves. On the other side of these two leaves are other pages, numbered 7 and 10, the seven being back of the 8 and the 10 back of the 9. They are the centre pages of a form of sixteen pages. Whatever the form of imposition, except that of the leaflet, the pages always come together in this order. Pages 8 and 9 are together, 7 and 10, 6 and 11, 5 and 12, 4 and 13, 3 and 14, 2 and 15 and 1 and 16. All regular forms begin making up at the lower left-hand corner, the head of the page being away from the compositor and its foot towards him. That is page 1. Page 16 lies alongside of it in a form of sixteens; in a form of eights page 8, and in a form of thirty-twos page 32. Each even page is at the same distance from the centre of the form as the odd page immediately preceding it. Thus, whatever the kind of regular imposition, 1 and 2, 7 and 8, 3 and 4 are at equal distances from the middle of the form. If, therefore, 1 is at the extreme right lower corner, 2 must be at the extreme left of the lower row, or at the extreme top of the left-hand row. That depends upon the fold.

When there is only one fold in a sheet that fold must be between the backs of pages. When there are two folds the first is between the heads and the second between the backs. In a sheet of three folds the first is at the front, the second between the heads, and the third through the back. In a sheet requiring four folds the first is at the foot, the second at the front, the third between the heads and the fourth through the back. These rules are only varied in the cases of a half sheet of octavo imposed eight pages in a row, heads on a line, or in a form to turn lengthwise of the pages, and in a half sheet of sixteens of oblong music pages. In the two former the first fold is at the front instead of between the heads, and in the latter the first fold is at the foot instead of the front.

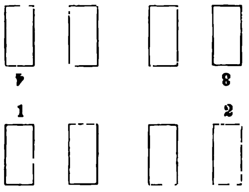
The thickness and stiffness of the paper make a great difference in the imposition, for very heavy paper cannot be worked on large forms, unless the sheets are afterwards cut before folding. When more than two folds are found the inner leaves are farther out than the outside leaves, and it is impossible on heavy paper to make the folds exactly true and cause the paper to lie smoothly. For this reason it is better to use small forms. Large forms, except upon very thin paper, will not admit of good folding, and if on thin paper the sheets feed and deliver badly. Thirty-two pages on a sheet are almost the extreme on good presswork. If the sheet is divided into two, four or more parts each of these is known as a section. The large forms are a combination of the smaller. They are thus printed for economy of presswork, but they must be divided for the convenience of the binder. This liability to bunchiness is greater in the twelves, twenty-fours and other irregular forms than in the eights, sixteens and thirty-twos, and for this reason the Riverside Press at Cambridge, Mass., one of the best establishments in the United States, has for a generation printed no twelves or other irregular forms. These are imposed as eights or sixteens. There is no difficulty in getting the paper to match the size of the form. In folding some binders make a slit at the top between the pages, on one side, so as to make the sheet lie even.

All of the regular forms of type have the first pages follow each other consecutively around the corners. They may be in either of the following ways:



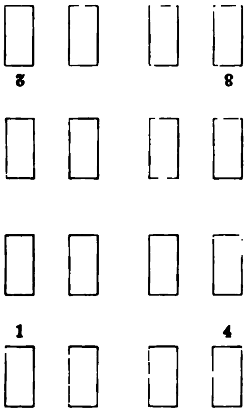
2.—Corner Pages of Each Imposition.

The inside pages do not matter. Thus the first of these diagrams elaborated is as follows:



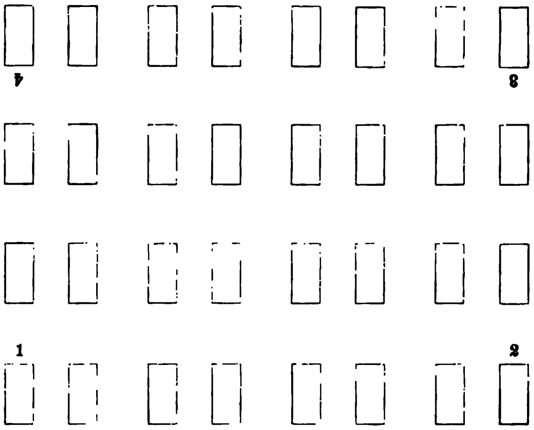
3.—Eight Pages in a Form.

The second is on this wise:



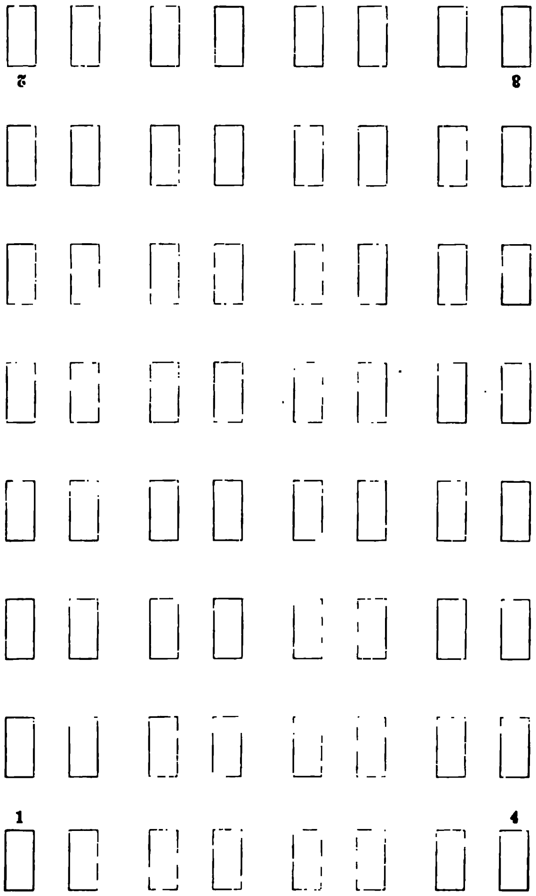
4.—Sixteen Pages in a Form.

Those who have learned the imposition of the forms given above, with a twelve-page form, have practically learned the mystery of all. The laying out of larger schemes is a detail. The margin comes at the side of each quarter, being narrowest at the side farthest from the page number, and next narrowest at the top; and each row of pages heads the same way. In the next the imposition is:



5.—Thirty-two Pages in a Form.

And in the last the order is thus:



6.—Sixty-four Pages in a Form.

If there were one hundred and twenty-eight pages the corner pages would be the same as where there are thirty-two, and if there were two hundred and fifty-six, supposing such an imposition existed, it would be the same as if there were sixty-four; for each alternate one changes the position, the fours, sixteens and sixty-fours being alike, and the eights, thirty-twos and one hundred and twenty-eights.

It is impossible for most compositors to memorize elaborate schemes of imposition, nor is it necessary, for by the various primary rules of imposition any regular form can be laid down without knowing any other than the corner pages, simply by addition. These rules are as follows:

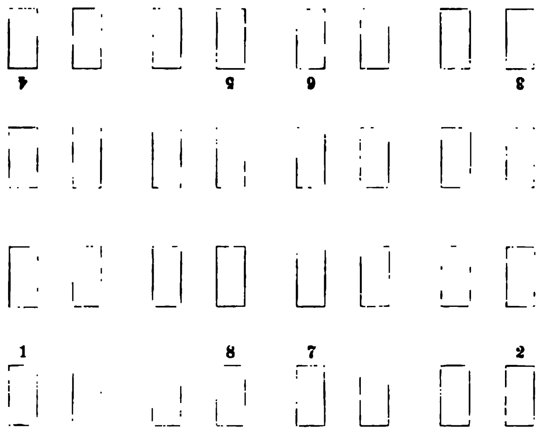
1. Every odd page has its folio at the end of the line, and every even page at the beginning. Therefore, as each page is paired with a companion page in a form, the left-hand page when its bottom is towards you is an odd page, and the right-hand page is an even page. The entire row of pages nearest the make-up has its bottom towards him, and it is difficult for him to read them; the next row has its heads the other way; the third reverses it again, and so on. In correcting matter the compositor finds this reversal a very serious disadvantage.

2. This companion page is always as distant from the centre in point of paging as the first. If one belongs to the first half of the form the other belongs to the second half. Thus in a sixteen-page form the 8 and 9 come together, the 7 and 10, and so on. The first page of the form lies closest to the last page; thus 1 and 16 are together. When the folios of any two pages so joined are added together they amount to the same sum as the folios of any other two like pages, and that sum is one more than the number of pages in the form, if the lowest page in a form is 1. Thus in a sixteen-page form these two pages would amount to 17, in a thirty-two 33, and in a sixty-four 65. This does not refer to the absolute pagination of the form, which might begin, for example, on page 321 and end on page 336; but the first page of this form is 321, the eighth 328 and the sixteenth 336. The companion page to 321 would be 336, to 324 333, and to 328 329. The relative order of the pages is, however, to be taken. This rule and that preceding insure that the two pages shall be right in their relations to each other and that the margin shall be right.

3. Each odd page is at the same distance from the centre of the form as the even page which backs it. Thus if 1 is at a corner 2 must be at a corner; if 11 is next to a corner 12 must be. This is a necessity, for however the paper is printed it must be in such a shape that every page must be properly backed.

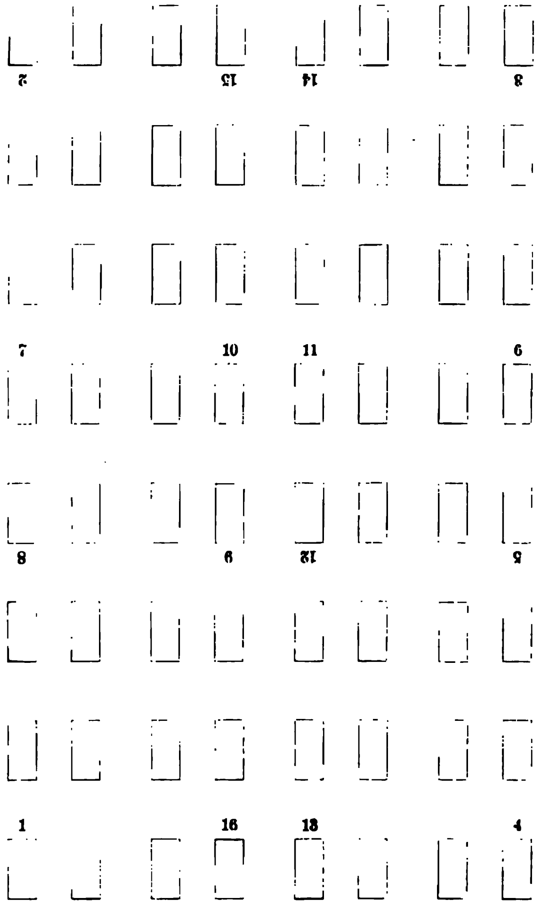
4. In all regular forms the pages whose heads come together have folios which when added together are either one more than half the number of the pages in a form, or one more than once and a half the number of pages which it contains. Expressed algebraically, they are either $\frac{x}{2}+1$ or $x1\frac{1}{2}+1$. Thus in an eight-page form the lower pages are 1, 8, 7, 2. The total number of pages in this form is eight, consequently some of these will add with the pages against their head to 5, for that is one more than half the number of pages in the form, and the others will add to one more than the whole number, to which half has been added. That will be 13. All pages thus tried must be either 5 or 13. If then we take the 1 4 is added to it, making 5; 8 has 5 added, making 13; 7 has 6 added, making 13, and 2 has 3 added, making 5. The rule about pages lying alongside of each other may also be expressed algebraically, as $x+1$ equals their totals. An ingenious French printer has devised a system by which every fact in regard to the order of pages is expressed algebraically.

5. The forms with numerous pages are simply the smaller forms with other pages inserted between those there shown. Thus the imposition of a sixteen-page form is the same as that of a four, other pages being between them; a thirty-two is that of an eight, two rows of pages being between the upper row, or 4, 5, 6, 3, and the lower row, or 1, 8, 7, 2. There are also two rows between 2 and 3, at the right hand, and 7 and 8; and two other rows between 1 and 4 and 8 and 5. Shown in a diagram it is



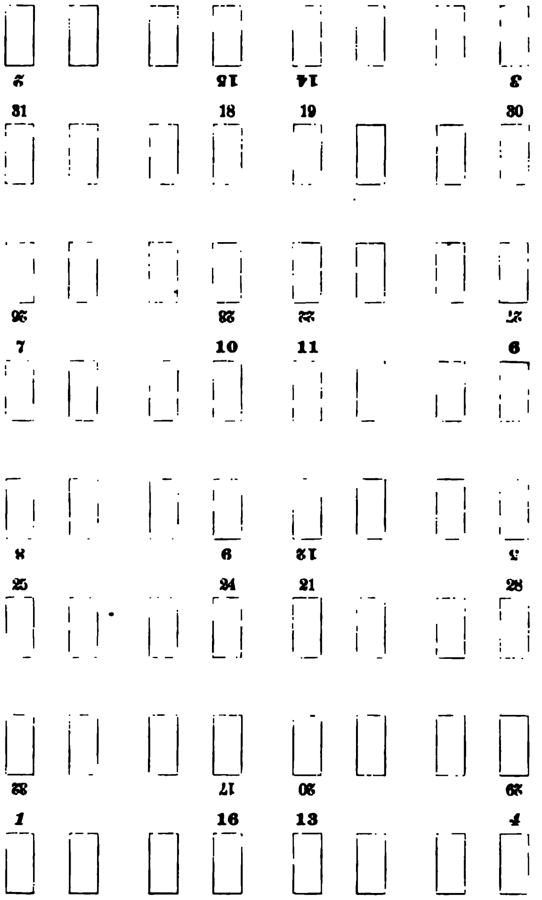
7.—A Skeleton of Thirty-two Pages.

A sixty-four is represented in skeleton form thus:



8.—A Skeleton of Sixty-four Pages.

Something more is necessary in a form as large as this. The outside pages of this form are a true octavo; the pages in the centre make it up to a sixteen. Addition at the head of these pages would give sixteen more pages, and when that is done a similar addition at the sides would show what the remainder is. In this diagram the successive stages are shown:



9.—Skeleton of Sixty-four Pages, Partly Filled Up.

In this diagram a skeleton of a sixty-four-page form is shown. First are given the corner pages, set in Italic full-face. They follow the rule of 1, 2, 3, 4. Next are found the Roman full-face figures immediately after, just as in a sixteen-page form, beginning with 5 and continuing until 16. The 5 jumps two figures from 4, then the line passes to 6, in the next compartment, jumping from this across the diagram, but following a rule all the time until the number is completed. The Roman figures are obtained by adding the folios already found to those of the pages which should go to their head in order to number 33. This rule filled the blanks in the four upright rows; the blanks in the four rows still vacant can be obtained by adding each number to one at its side in order to sum up 65. It will be seen that the left-hand outside row is 1, 8, 7, 2, and the right-hand 4, 5, 6, 3, just as in an eight-page form. Adding the eight other pages necessary to make a sixteen-page form they fit in this larger form exactly.

The imposition of a one hundred and twenty-eight follows the same rule. The form itself is very uncommon, and is given in the various books rather as showing what can be done than for its practical use. On paper 24 by 38 the size of the leaf would be only 2⅜ inches by 3, and the printed page in long primer would be eleven and a half by fourteen and a half ems. Sixty-fours, seventy-twos, eighties and ninety-sixes are also rather curiosities than anything else, their use being rare and mostly confined to cases where an extra four, eight or sixteen pages are left over at the end of a book and it is desired to impose the last form so that the whole may be worked together, thus saving one presswork. Of course the size of the paper must be altered. It is impossible to fold a one hundred and twenty-eight on ordinary paper without cutting, as the creases are unmanageable.

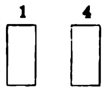
Irregular forms are those in which a transposition takes place in order to gain some advantage in folding or presswork, or where any number of pages other than the squares of two are printed. These latter are all multiples of three or five, and most of them require the sheet to be cut after it is printed. In some cases they can be folded in without previous cutting. Eighteens and a few other forms require a transposition of some of the pages after the first side is worked off and before the form can go on again. The methods of imposing these odd forms are extremely numerous, and there are also many ways of imposing the regular forms. Formerly it was much more necessary to understand irregular imposition than now, as paper was so dear that every particle had to be economized, and presswork was so high priced that every device had to be adopted in order to lessen the amount. In New York at the present day nine thousand impressions of a sixteen-page form of octavo can be finished in a day at a cost of, say, ten dollars for presswork. The paper might cost eighty dollars. Seventy years ago in New York the employer would have charged two hundred and fifty dollars for the same amount of work which thus could be afforded at present for ninety dollars. Then presses could not print a double-medium sheet; very few could print one of medium size. It is probable that the matter would have to be imposed in such a manner as to make three forms, or three sheets of eight pages each, smaller than our octavos. These twenty-seven thousand impressions would have required two men for two weeks, their wages being at about ten dollars a week. Thus the presswork would have cost forty dollars. Three-quarters must be added to this for the employer's charge. The same number of sheets of paper, at three dollars a ream, the common price then, would have amounted to one hundred and eighty dollars. Is it any wonder, therefore, that at a time when printing was dear, that on a job which then cost two hundred and fifty dollars (but which now can be executed for ninety), while the purchasing capacity of the public was very small, there should have been a desire to save in every way and to utilize every scrap of paper and every part of presswork? Thus we find in our old books directions for imposing every variety of fragment. A book ends with four pages left over. Another book ends with ten over, and a third ends with six. The printer must try whether the three cannot be imposed together as a twenty. Savage gives one hundred and fifty-three ways of imposition, some of our most useful forms being unknown to him, and all on paper not more than 24 by 35.

Inside impositions are not so much used as formerly. Every deficiency in the hand-press had to be guarded against, and the forms were small. It is much easier in a large form to prevent light pages from being crushed or over-inked than when they occur in a small one, the same press being used. This transposition must take place by quarters, each combination of four pages which is together being removed to a new location, so that the corners are inside. See for an example of this under the sixteens (diagram 21). Another method of doing this is to divide the form in the middle, taking that which was on the left and placing it on the right. Of course companion pages cannot be divided.

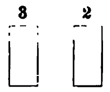
Forms which contain twelve, eighteen, twenty-four, thirty-six, forty, forty-eight, seventy-two and ninety-six pages are more troublesome than others, either imposed from the centre or not. They consist of a regular form formed from a multiple of four and two, with the addition of a few other pages. Thus a form of twelve pages is an eight and a four; an eighteen a twelve, a four and a two; a twenty a sixteen and a four; a twenty-four a sixteen and an eight; a thirty-six a thirty-two and a four; a forty a thirty-two and an eight; a forty-eight a thirty-two and a sixteen; a seventy-two a sixty-four and an eight, and a ninety-six a sixty-four and a thirty-two. If to be folded in without cutting, usually only one row of pages is thus treated. If cut off, the strip of leaves can be placed in any position that it is desired to have it. Thus, in a twelve-page form the offcut can be either 1, 2, 11, 12; 3, 4, 10, 11; or 5, 6, 7, 8. Most commonly the inset is placed in this third position, sometimes in the first, but very rarely in the second, as it is much more difficult to fold.

Signatures are used on the first page of each form and on each inset. The object of signatures is to guide the binder; one on each sheet is enough, but it is highly necessary to have them in a second place when complex forms are printed. A secondary signature takes a star, and a third signature two stars. Thus in a form of twelve pages the main sheet takes its signature on page 1, and the secondary signature goes on the inset, which probably is page 5. There is no limit to the number of insets.

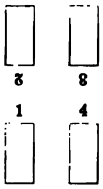
Having these general ideas in mind, the consideration of each form in detail can be taken up. No directions need be given for broadsides, which include handbills, posters, and all work printed on one side only, nor for leaves printed on both sides. They can be printed as 1, 2, or 2, 1, with equal freedom. Folios may be imposed two pages at a time, as in country newspapers, or four pages at a time, as is done in offices where there is an abundance of type:



10.—OUTER FORM.



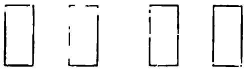
11.—INNER FORM.



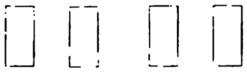
12.—IMPOSED TOGETHER.

This imposition is common for newspapers. Working in this way, and standing at the top, the make-up can see his type perfectly, the head being against him. When imposed together, the bottom of the lower row of pages is against the make-up, and he can see the upper row better than he can the lower. Forms like the first two can also be printed together, in a long strip, by simply making the margins right. Thus, if the pages were octavo pages, requiring nine inches in height for paper, they could be printed on a strip nine inches by twenty-four, turned and worked on the back, and then divided, being a sheet of twelve inches by nine.

QUARTOS.—A quarto is a sheet having four leaves or eight pages. If the parts are imposed separately, 1, 4, 5 and 8 are in the outside form, and the other pages in the inside form. One imposition is:

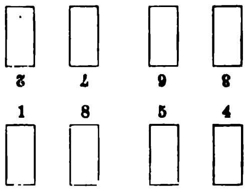


13.—OUTER FORM.



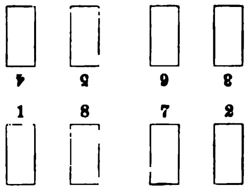
14.—INNER FORM.

It will be seen that the imposition together is by taking the inside form and turning it around so that its



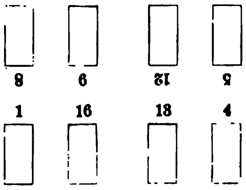
15.—IMPOSED TOGETHER.

extreme right will head against the extreme left of the other form; but this can be and would be imposed in a small office by dividing the form and printing the two parts separately. The sheet in the example turns lengthwise of the pages. In the most usual imposition, however, the paper turns crosswise of the sheet. It is:

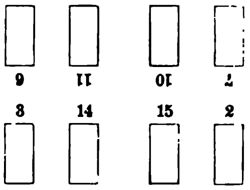


16.—OUTER FORM. INNER FORM.

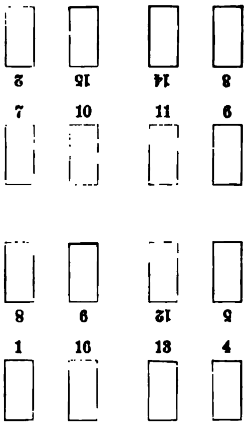
Little work, however, is done in book offices except on octavos and smaller. Quarto and folio pages are often printed eight or sixteen at a time, and therefore follow the rules of imposition of the greater number of pages. The usual octavo imposition is:



17.—OUTER FORM.

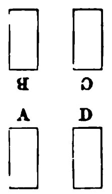


18.—INNER FORM.

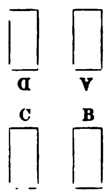


19.—IMPOSED TOGETHER.

It frequently happens that a form must be imposed differently, as when a hollow page or pages or a delicate engraving would otherwise be at the sides. The lower left-hand corner or quarter of the form is transposed to the upper right-hand corner; the lower right corner is moved to the upper left-hand corner, and the two quarters thus transferred take the place of the others. Originally they are like No. 20:

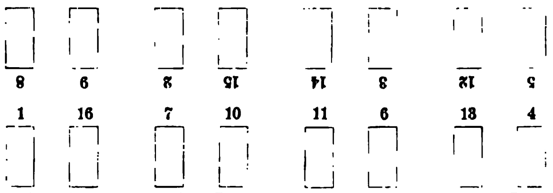


20.—Quarters of a Form, Untransposed.



21.—Quarters of a Form, Transposed.

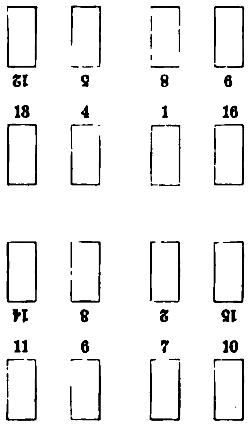
After the transposition they are like No. 21. None of the pages are otherwise changed. They stand the same relatively to each other in the quarter that they did before. These quarters are:



22.—A 23.—B 24.—C 25.—D

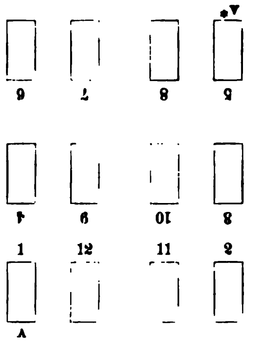
Quarters of a Form, Separated.

The quarters here shown do not make an imposition. They are simply given to show that a complete form is made up of parts, and that these parts can be placed in new positions. the sheet still being so that it can be folded.



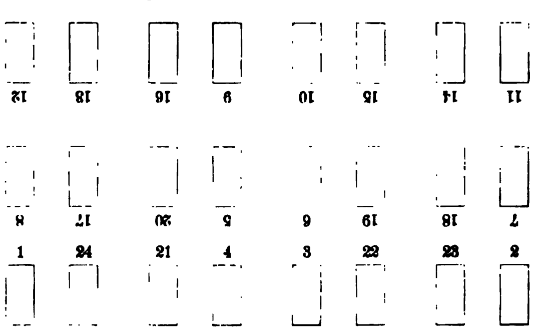
26.—Sixteen Pages Imposed from the Centre.

Duodecimo.—As noted previously, a duodecimo is a sheet of eight leaves with an inset of four, making twenty-four pages in all. It is usual to cut off this inset and fold it in at the centre of the sheet, but circumstances may require it to be at the outside. There are also methods of imposing so that it is not necessary to cut off the addition of four leaves. A duodecimo form is capable of being imposed in many ways, as the peculiarity of the cut-off or other inset enables this sheet to be printed in a manner impossible with regular impositions. For instance, in diagram No. 28 the top row could be imposed so that the heads would be at the top, the whole row being turned around, and the foot of 11 coming against the foot of 8. When duodecimo is imposed twelve pages at a time, then to be turned and worked on the other side, it is laid thus:



27.—Duodecimo.

The top row of pages is the one cut off, and is where the crossbar of the chase is. The margin in this place is the foot margin of one page and the head margin of another. The signature is on the first page as usual, and on the first page of the offcut. A regular form of duodecimo, printing both sides at once, is:



28.—Duodecimo, Both Sides Together.

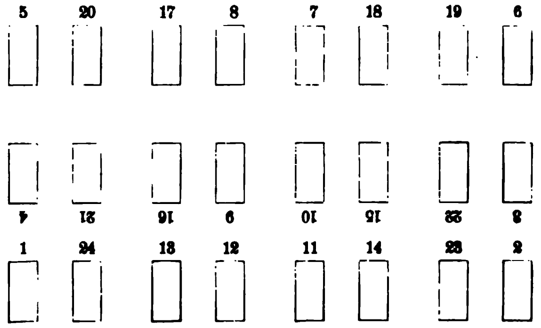
The form here shown can also be used as a guide for other purposes. The sixteen pages on one side of the cross can be employed for an imposition of that kind, following them in their order, but paying no attention to the omissions. They would be:

8 9 12 5 6 11 10 7
1 16 13 4 3 14 15 2

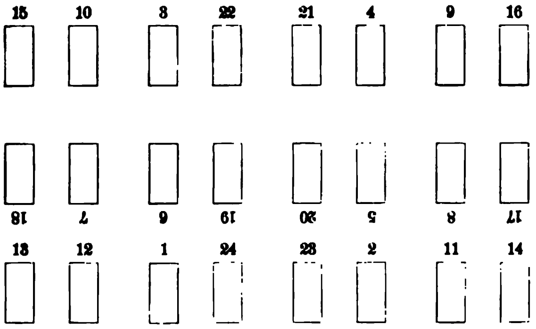
The offcut is also a real imposition, having eight pages, and beginning at 1 it runs:

3 6 7 2 1 8 5 4

A sheet of duodecimo without cutting is:



29.—Duodecimo, without Cutting.

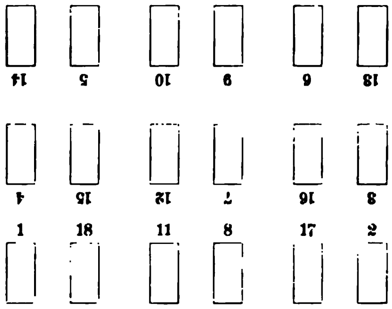


30.—OUTER FORM. 31.—INNER FORM.

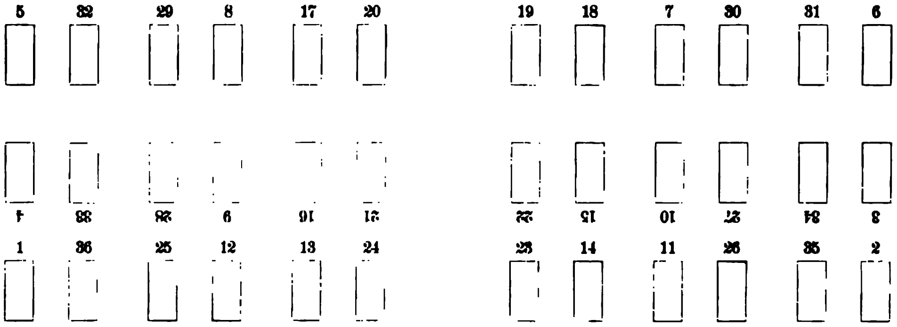
FRENCH SHEET OF DUODECIMO.

This was named after the discoverer, a girl. By placing it with page 21 in the upper right-hand corner, and always folding towards the person, there are no waste movements. Owing to the difficulty of registering, binders very rarely use this, except for cheap work.

EIGHTEENS.—Eighteens are not now much used, the simpler forms taking their place. When printed in eighteen pages, then to perfect on itself, this form is as given in No. 34. After the first side is printed pages 11 and 8 are to be transposed to the places of pages 7 and 12, and they into the places thus left vacant. Then the second side can be printed.

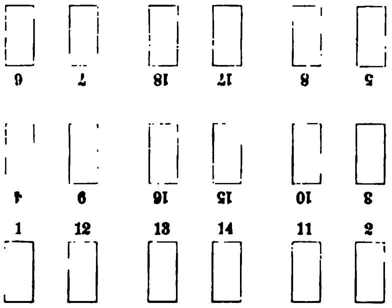


34.—A FORM OF EIGHTEENS.



36.—OUTER FORM. 37.—INNER FORM.

A SHEET OF EIGHTEENS TO BE FOLDED UP TOGETHER.

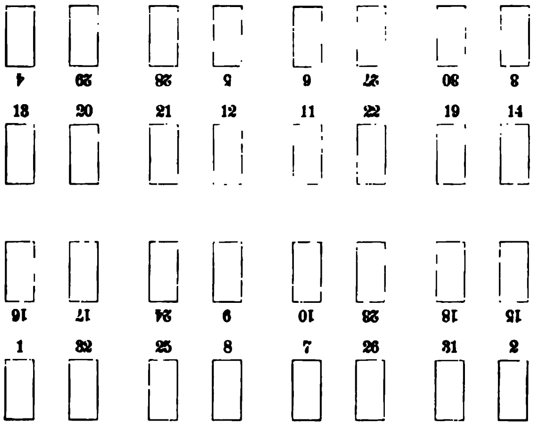


35.—A HALF SHEET OF EIGHTEENS, REQUIRING NO TRANSPOSITION.

This method of imposition is very objectionable, as there will be, when the paper is cut up, three single leaves.

Two difficulties with eighteens are that it is difficult to remember either the lay of the form or the method of folding after the sheet is printed. But there is very little reason now for using such an imposition. An eighteenmo page can be worked in eight-page forms on paper 12⅔ by 16 inches; in sixteen-page forms on paper 16 by 25⅓, and in thirty-two-page forms on paper 25⅓ by 32. Sixty-four pages could be done on paper 32 by 50 or 51. As paper is now easy to be obtained of all sizes, this kind of imposition will frequently be found the best.

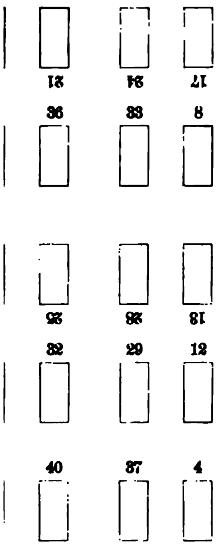
SIXTEENMO.—The next size is sixteenmo, a barbarous word, but which is firmly established in printing-offices. This follows the rule of corner pages of quartos, the second page being on a line with the first and heading the same way. Duodecimos are now largely imposed in forms of sixteen and thirty-two pages. The regular imposition of a sixteenmo is as follows:

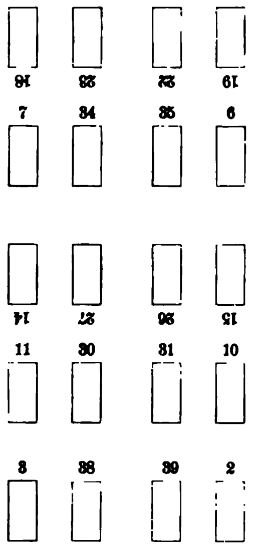


32.—OUTER FORM. 33.—INNER FORM.

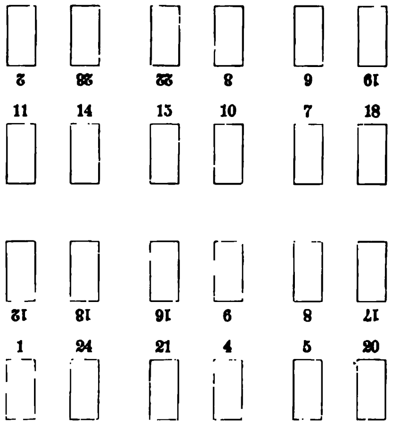
IMPOSITION OF A SIXTEENMO.

Printed separately, the left-hand half backs on the right-hand half, and they are often printed separately.

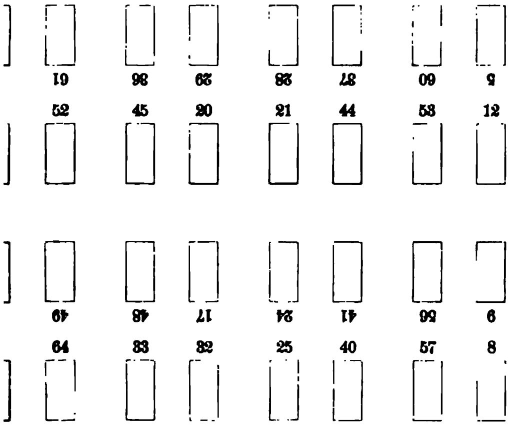




38.—Outer Form. 39.—Inner Form.
Twenties.

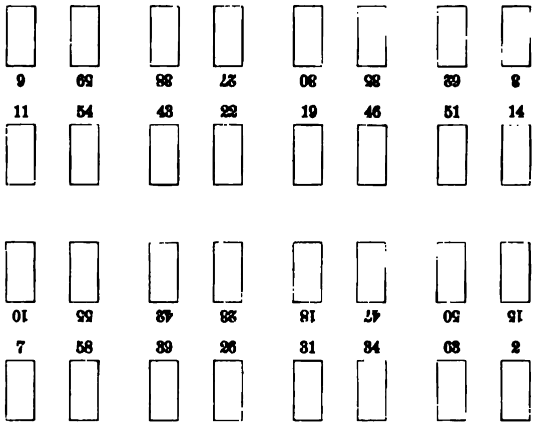


10.—Half a Sheet of Twenty-fours, without Cutting.

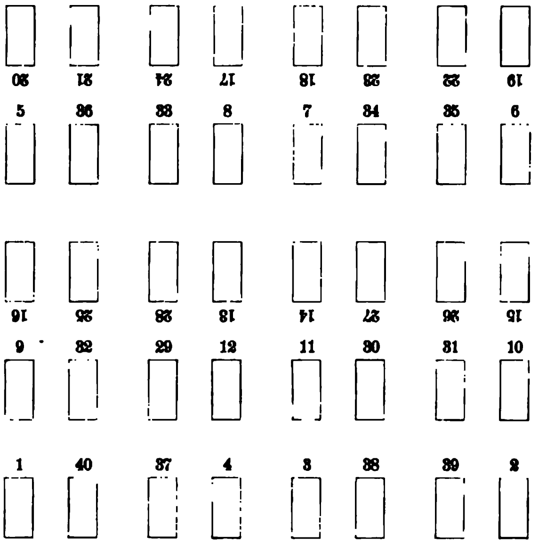


41.—A Sheet of Thirty-twos—Outer Form.

No. 42 lies alongside of No. 41 in imposition, being at its left. The sheet then turns end for end. This is practically the largest form used in bookwork when it is all folded up as one section, but even this is objectionable on account of the thickness of the last fold.



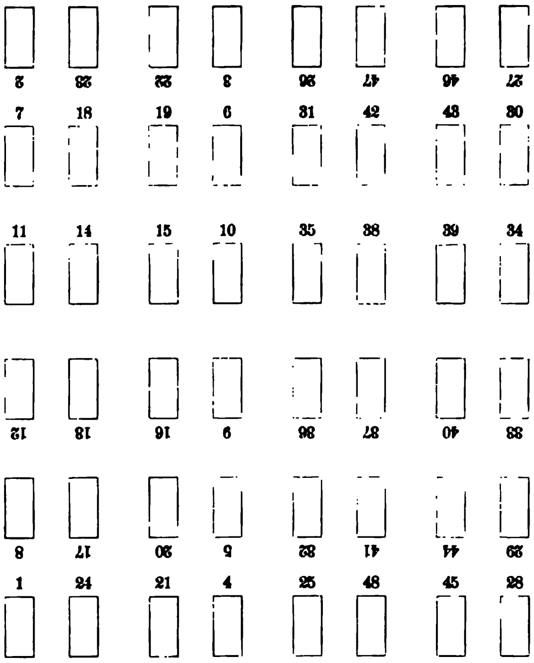
42.—A Sheet of Thirty-twos—Inner Form.



43.—Half a Sheet of Forties.

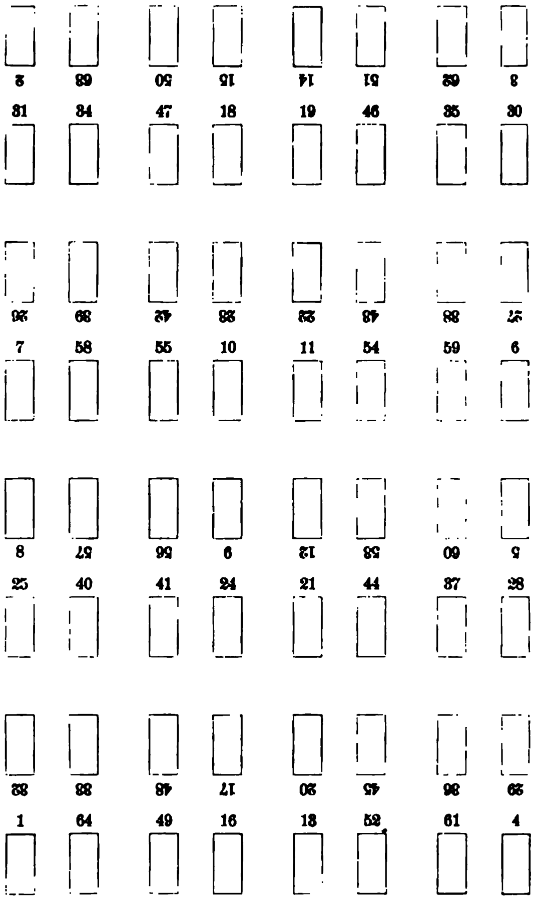
A forty is very rarely imposed, except at the end of a book, to save a little paper and presswork. It is among those numerous impositions which are to be found in the older books and which have very little real utility. Some of them are extremely complicated, the pages requiring transposition after one side is worked in order to render them right on the second side. This half sheet of forties is the same as a sheet of twenties, and an examination of the diagrams will show the reason for the change of name. So rare is the imposition of twenties and forties that Joseph Sabin, the eminent bibliographer, a few years since denied its existence. He had not met with any examples in the books he was engaged in cataloguing. It would be easy to impose them otherwise, so that the inset could be folded in without difficulty in other places in the sheet.

In the following the left-hand side is a complete form of twenty-four pages, as is the right-hand, each making an entire sheet, but the right-hand being gathered after the left-hand. It will be seen that beginning with this imposition the parts of forms are separate sheets, having no relation to each other. The first twenty-four pages here might be the sonnets of Shakespeare, and the second twenty-four a part of a medical treatise. It is simply a method of saving presswork. In the forty-eights the parts are 1, 2; in the seventy-twos, 1, 2, 3; and in the ninety-sixes, 1, 2, 3, 4. Each of these parts is independent of the other. The sheet when printed on one side is turned over, from bottom to top, and the second side is worked. Then the paper is cut apart, making two sheets in one, three in the other and four in the last. This is capable of still further extension, and can be carried as far as the press will allow.



44.—HALF A SHEET OF FORTY-EIGHTS.

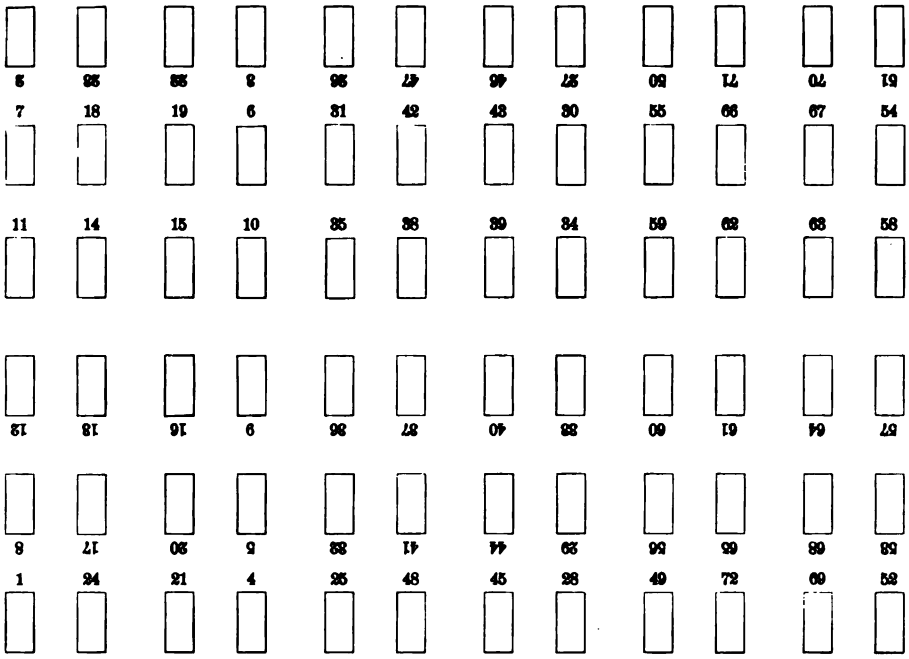
This principle is very little understood. Most compositors who have had no opportunity of studying folding and the operations of a press have an idea that a sheet once printed must be folded in some way, and that if they cannot do it properly it is because they have not been well instructed. This is a mistake. It is almost impossible to fold a sheet having many pages. The folds are harsh and intractable. A workman only needs to take a common folio paper and fold it so as to make one hundred and twenty-eight pages and he will recognize the difficulty. There is no trouble in feeding the sheet or in imposing the form, but the folding is nearly impossible. Therefore the sheets are cut and make lesser ones. Supposing a job-printer had a variety of cards to print at once, and decided to put them on a half-medium press, feeding a large sheet of card-board, which could be cut up afterwards. The No. 6 cards could make one row, the No. 5 another row, and so on till the whole size of the press was reached. Then the presswork would begin. Afterwards the cards could be cut up. Each of these cards would be for a different man, and they would bear no relationship to each other. Neither must there be any correspondence between the first twenty-four pages in a forty-eight and the second twenty-four. There may be a connection, but it is not necessary. It is sometimes a wonder to country printers how some jobs, for instance, tags, are worked so cheaply in the great cities. It depends upon this economy.



45.—HALF A SHEET OF SIXTY-FOURS.

While the remarks upon No. 44 are correct as to folding, it will sometimes happen that a sheet is wanted which will all fold up at once, although having many pages. An almanac is an instance, and some kinds of patent-medicine pamphlets afford other instances. In this case a sixty-four, worked as a half sheet, gives the required size and form. It is printed and then turned for the reiteration, making two complete sheets. With a thin paper the folding can be accomplished. The largest book-paper, 33 by 46, would give pages of crown octavo, the leaves being 5⅔ by 8¼ inches, but this size usually comes only in heavy papers. A double 24 by 38 or other size made in all weights would be more advantageous. It is impossible to print a very fine book as a sixty-four unless afterwards cut up into sections.

The succeeding diagrams are simply illustrations of what can be done in certain cases. They follow the rule laid down under No. 44. We may at some day, when automatic feeding shall have been accomplished, and when presses are larger or when web presses are used on books of large editions, see an extension of this system of imposition. The Century Magazine and Harper's Monthly are now printed sixty-four pages at a time, and it is not impossible that larger presses or differently constructed ones may demand still larger forms. The difficulties on the part of getting the plates or the type ready

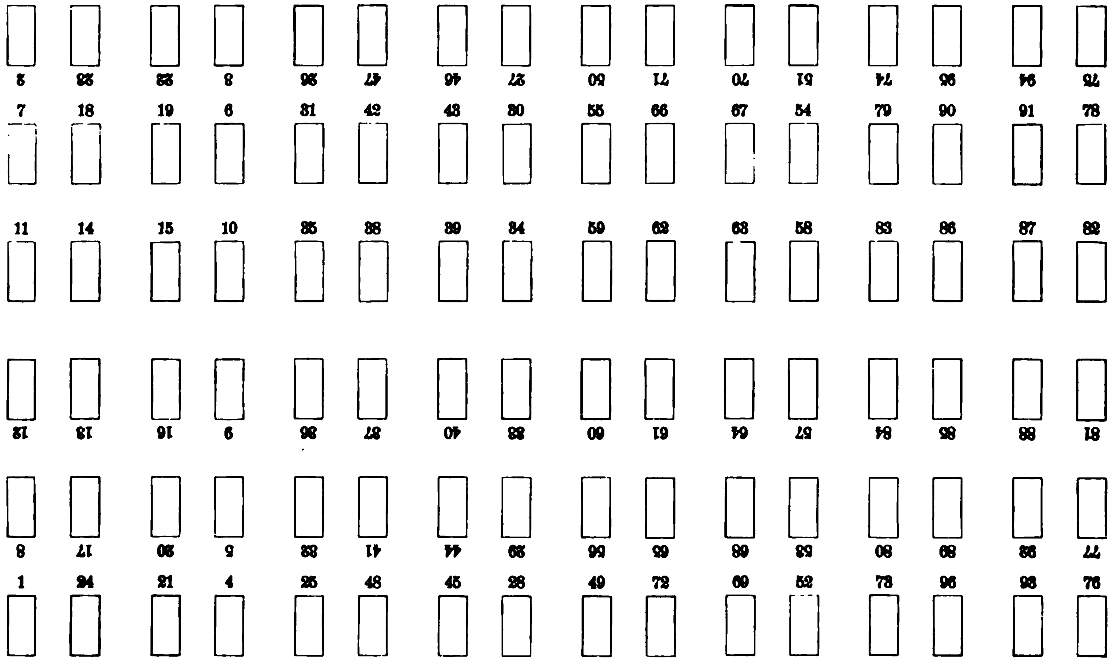


46.—Half a Sheet of Seventy-twos.

are now out of the way; the problem lies with the press. It is evident that the greater the size of the press the fewer impressions will be requisite to print a certain number of pages. Between the invention of printing and the discoveries of Lord Stanhope four octavo pages made a form; with the iron hand-press eight pages: with the power-presses from one-half more to double the size. The Century machine is still larger. The magnitude of the machine to come none can tell. It may much exceed anything we now think of.

Diagrams 46 and 47 are identical, until page 72 is imposed. The last twenty-four pages are then added. The diagram of the left-hand section would make a good imposition of a half sheet of twenty-fours.

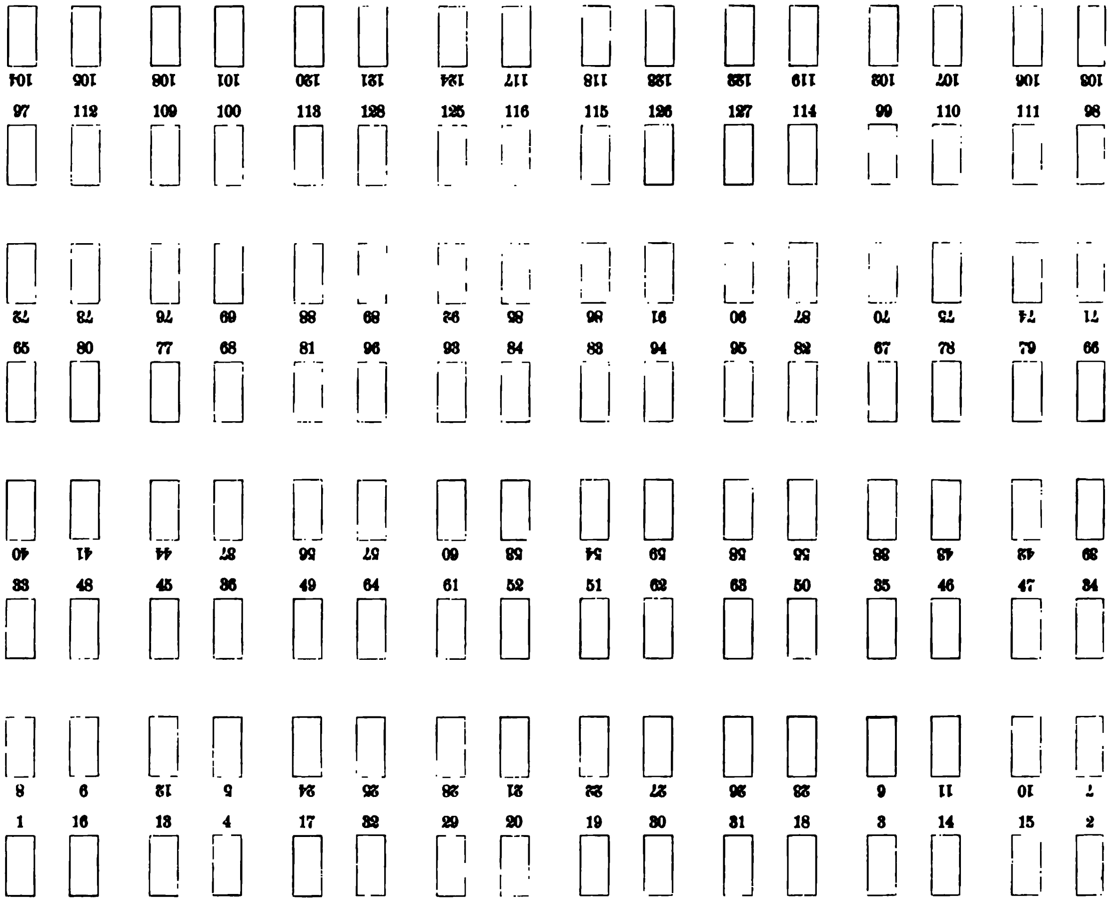
In this sheet there are really four forms, the first at the left having from pages 1 to 24; the second, next to it,



47.—Half a Sheet of Ninety-sixes.

from 25 to 48, the third from 49 to 72, and the fourth from 73 to 96. Each of these lesser sheets has twenty-four pages.

In the last of these diagrams there are four forms, divided from each other longitudinally, and each having thirty-two pages. The first is from 1 to 32, the second from 33 to 64, the third from 65 to 96, and the last from 97 to 128. Each of these strips, being sixteen pages long by two high, turns on itself, then being divided in the centre of the length, and making two octavo forms, printed upon both sides. Thus eight sixteen-page pamphlets can be printed at once. The cutting up of the paper would not be in strips, but one cut across the narrow way, and three in succession on each of the halves. Each of these pamphlets might be on different matter.



48.—Half a Sheet of One Hundred and Twenty-eights.

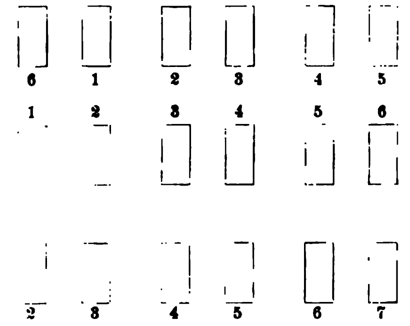
Quiring.—Formerly many books of small size were done by quiring, and in the fifteenth and sixteenth centuries those of large size were frequently so handled. Note-paper as received by the public from a stationer is quired, each succeeding sheet being nested in that preceding. A familiar case of quiring is in an ordinary four-page country paper with a four-page supplement. This is folded in between the pages previously known as 2 and 3, but which by this quiring become 2 and 7. Quiring is frequently adopted by little job offices, as, for instance, in court dockets. So many cases go to a page. It is therefore easy to determine how many pages the entire docket will make, and to cast off the work accordingly. Suppose there are two hundred and fifty cases, five on a page. This will make fifty pages. As soon as the compositor has set the first five cases he sets the last five. These are imposed together and worked on the job press. Then the second page and next to the last are printed, so as to give a backing to pages 1 and 50. Then the other pages are proceeded with.

Quired impositions are of two or four pages, the latter being where both sides of the two leaves are printed at once. The whole number of pages that are to be in the book or pamphlet is determined. It must be divisible by 4. Supposing it to be 64, the pages printed together will be as follows:

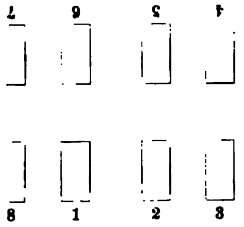
1—64
2—63
3—62
4—61
5—60
6—59
7—58
8—57
9—56
10—55
11—54
12—53
13—52
14—51
15—50
16—49
17—48
18—47
19—46
20—45
21—44
22—43
23—42
24—41
25—40
26—39
27—38
28—37
29—36
30—35
31—34
32—33

The pages which are on the outside of the leaf are 1, 3, 5, 7, and so on; those which back them are 2, 4, 6, 8, and continuing. Pages 32 and 33 come in the centre of the book.

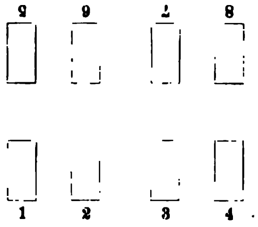
Leaflets.—These are much used by railroads and real-estate men, and in some other classes of business. They are thus made for convenience of carrying in the ocket. In many cases there is a large map on one side. hey seem to have been unknown before the general ntroduction of the power-press. Margins are nearly lways narrow.



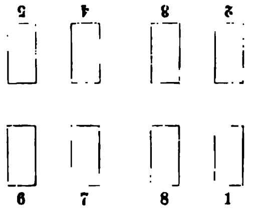
49.—Six-Page Leaflets.



50.—First Page Next to the Left.

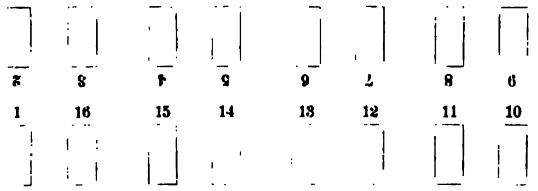


51.—First Page to the Left.



52.—First Page to the Right.

Eight-Page Leaflets.



53.—Sixteen-Page Leaflets.

Imposition-Book.—The book used in a composing-om in England to indicate the progress of a work and ne number of pages credited to each compositor.

Imposition-Scales.—The various schemes or plans y which pages are laid down on the stone for imposi-on.—*Jacobi*. In America we say schemes of imposition.

Imprenta (Sp.).—A printing-office; the material or lant of a printing-office; printing (art of).

Impresión (Sp.).—Impression; (the act of) printing; ie printed work.

Impresor (Sp.).—Printer.

Impression.—1. The pressure applied to the form by means of a platen or cylinder to give a print from type or from a cut. This is regulated by screws or wedges, according to the kind of press, and is further regulated by bearers and by overlays and underlays. All parts of a form do not usually receive the same impression. This is greater at the edges than in the centre. Bearers are therefore so contrived that a portion of the pressure shall fall on them, and that they shall shield the matter inside. It is essential, also, that a greater quantity of ink and a greater amount of pressure shall be on those lines and those portions of cuts which require to be the blackest. The tendency of modern printing is to use no more ink than shall be necessary to give a readable impression. It must not be overcharged. Consequently only the thinnest possible film of ink is used to cover the tops of letters. When a body mark occurs wider than the sixth or seventh of a pica this plan cannot be employed, nor can it give satisfactory results on a cut. Each of these must have abundance of color. Therefore, when a line in display is likely to be gray it is raised by an underlay the thickness of a sheet of paper or more, and being above the other letters receives more ink and having more impression leaves more on the sheet. Underlaying, however, cannot be done extensively unless when low plates or type are in a form mixed with those of normal height. Overlaying is a method of increasing the pressure by pasting against the impression cylinder or upon a tympan pieces of paper so that a greater force is applied to the type. The ink is taken off much more completely, and when the type or cut is rolled again it receives a supply much larger than places of equal size against which there is no pressure of overlays. A skillful management of impression therefore is the art of obtaining a well-printed sheet. 2. An engraving. The first and most valuable impression from an engraved plate is called remark proof (French, remarque), and has a special sketch or emblem engraved, at the engraver's fancy, on the margin of the plate, such as a head, a landscape in outline, &c. Of these there are usually from fifty to a hundred copies; but they are frequently omitted altogether in all save the most costly plates. The remark having been polished off, the second impression, artist's proof (French, épreuve d'artiste), is distinguished by having the name of the painter or engraver in signature, and consists usually of an edition of 200 copies. The third impression, proof before letters (French, épreuve avant la lettre), is taken before the title has been engraved on the plate and is never signed by the artist or engraver, but has their names engraved in small letters on the right and left hand corners of the plate respectively. The edition of this impression is usually a hundred.

Impression en Couleurs (Fr.).—An impression in colors; printing in colors.

Impression Screws.—The screws which regulate the amount of pressure in a printing press or machine.

Impression Sheets.—The sheets which are placed between the tympan or around the cylinder to receive the impression.

Imprimatur (Lat.).—"Let it be printed;" the imprint of a firm; also used by the proof-reader in some foreign countries in marking proof as ready for printing; the permit of the censor used at the present day by the Roman Catholic hierarchy in approbation of a Roman Catholic work.

Imprimer (Fr.).—To print.

Imprimerie (Fr.).—Printing-office.

Imprimeur (Fr.).—Printer.

Imprimir (Sp.).—To print.

Imprint.—The name or address of the printer affixed to a job, or his name upon the title or back of the title of a book, thus signifying that it has been printed by him. On jobs it should always be very small. It never should be used except when the printer is thoroughly satisfied with the production; in other cases he should omit it. In England it is obligatory upon the printer to put his name upon every newspaper which he publishes. This is generally done at the bottom of the last column of the last page.

In Boards.—When a volume is cut after the millboards are attached it is said to be "cut in boards." This is also applied to a style of binding in which the boards are merely covered with paper.

In-Douze (Fr.).—Duodecimo.

In-Folio (Fr.).—Folio.

In-Octave (Fr.).—Octavo.

In-Quarto (Fr.).—Quarto.

In-Seize (Fr.).—Sixteens.

In the Hole.—A compositor behindhand with his copy and keeping his companions waiting is thus described in England; in America it is generally said he is in the gap.

In the Metal.—Anything in type; the reverse of anything in print; for instance, to read a revise in the metal without taking a proof.

In the Opening.—When compositors wait for a companion to finish his copy in order that the making-up may be passed, the person so waited for is declared to be in the opening. So said in England.

Incassamento (Ital.).—Laying cases.

Inchiostro (Ital.).—Ink.

Incunabula.—This term (derived from the Latin cunæ, signifying cradle) is applied to those editions of books (the beginnings of printed literature) which were printed before the year 1500, a period of about fifty years. Peignot explains it as signifying editions "qui touchent au berceau de l'imprimerie." Printing had by that time spread through Germany, Holland, France, Spain, Belgium, Italy, Switzerland, England and some other countries, and had begun to assume some of its present appearance. These books are much sought for. Catalogues and works upon them are numerous, so that the collector who begins with a reasonable amount of money and considerable time can attain a very thorough knowledge concerning them, if he is in Europe. American libraries have very small collections of incunabula, the best, probably, being in the Union Theological Seminary of New York. A knowledge of Latin is indispensable to any one who aspires to any solid knowledge on this subject, as two-thirds of the works known under this title were published in that language.

Indelible Ink.—Special ink of a lasting character, used mostly for marking-ink.

Indent.—A line set back or forward a little; for instance, the beginning of a paragraph, which is generally indented an em.

Indentation.—The setting back of a line somewhat. A common indentation is to indent an em quadrat at the beginning of a paragraph. A hanging indentation is where the first line is flush or begins with the beginning of the line, and other lines are indented one, two or three ems. It is usual to indent one em. Where matter is leaded, and is thirty ems in width, it looks well to indent one em and a half; if forty ems the indentation should be two ems, and if fifty ems the proper amount is three ems.

Index.—1. The mark ☞, commonly known as a fist or hand in a printing-office. In small type the index is always pointing to the end of the line, but in large type it is made both right and left handed, and is of colossal size in wood type. As a mark of reference an index is the seventh, immediately following the paragraph.

2. The word index is applied to a short alphabetical summary of the contents of a book, consisting of a reference and the page number, so that the passage sought can be instantly found. It differs from a table of contents by being arranged according to the subject and not according to the order in which the matter may appear in a book. A good index is something very much to be desired in all books. The fuller the index the more valuable is the book. As a rule the unimportant words are omitted in an index. Thus, if the "Life and History of the Times of George Washington" were to be indexed it would probably appear as "Washington, George, Life of," or "Washington, George, Times of." In an ordinary index even important words may be omitted or put in the rear to bring out the more distinctive ideas. Thus "Works of John Hancock" is better indexed "Hancock, John, Works of." Where space will allow entries should be made under as many titles as possible. Indexes usually begin flush, end without a comma, and are carried out by leaders to the distance which the greatest number will require. Thus, in lines like these

Prince Consort, Early Life of 197
Printing, Discovery of 47
Prize-Fighting, Why it should be Discouraged 1047

there should be a space of an em quadrat before 197 to allow for the first figure in 1047. Lines run over and are indented by a hanging indentation. Indexes take an extra charge. They are usually in double columns, but sometimes reach three, four and five.

Index Expurgatorius or **Index Librorum Prohibitorum** (Lat.).—A list of books prohibited by the Roman Catholic Church.

Index-Making.—Proof-readers and authors are frequently obliged to make indexes, and it is well to know an expeditious and thorough method. That which next follows is by Andrew W. Tuer, a very skillful literary man and printer in England:

"'What,' I am sometimes asked, 'is the least troublesome way of making an index? Can the plan I follow be bettered?' It may be assumed that the index to be manufactured is not of a special nature, requiring subdivisions of subjects. Galley slips being obviously useless for the purpose, one must wait until a complete proof of the book, made up into numbered pages, is to hand. Beginning at chapter one, the author carefully dictates to a shorthand amanuensis every separate item and its page, completing cross-references as the work proceeds, and bearing in mind that a good index cannot be too full. When the last page is reached the amanuensis will write out the references, leaving a blank line between each, on sheets of ruled paper of uniform size. A second assistant will then call over the whole of the written-out references and cross-references, which will be carefully checked by the book. During the progress of this tedious business, and in fact until the index is completed, the author may be a man of leisure.

"Mistakes corrected, the sheets are scissored through the blank lines into separate slips, and each placed under its own letter in an open case divided into compartments marked from A to Z. Such a case, made of cloth or leather, with collapsible gusset pockets, may be got for two or three shillings. All the A slips are now taken out, arranged in proper sequence (Aa, Ab, &c.), and pasted in their proper order on one side of sheets of paper of uniform size, which for the printer's guidance should be consecutively numbered. The other letters follow, and, with perhaps as little trouble to the author as he could reasonably expect, the work comes to an end. The written slips having been previously checked, the index, when in type, can be safely corrected from them, and the wearisome task avoided of separately looking up in the book every reference for verification."

In some respects this is not adaptable to all needs. A shorthand writer is not always available; there may be no second assistant, and a pocketbook with collapsible gusset pockets may not be at hand. Take the book and make the references on paper four inches wide. Let each reference be at least an inch in depth. When done, according to the method given by Mr. Tuer, divide into four subdivisions, A to E inclusive, F to K inclusive, L to Q inclusive, and R to the end of the alphabet. When done divide the first lot, A to E, into five portions, and continue this plan until the A is done. Then subdivide that until every word which begins with an A is alphabetized down to its very last letter. If you have twenty thousand slips and four thousand of them refer to A to E, one thousand will probably be enough for A, and two hundred for A to Æ. Begin pasting as soon as Ab is done, and continue until all are finished. Scrutinize the slips as they are pasted, and when all done go over them again to see that they are alphabetized rightly. This must also be done in the proof. If it is found, after the A's are pasted up, that some stray word like "Astle" is among the O's, write it in. The verification against copy should be before the sheets are cut up. These sheets should be just the width of the index slips. On this plan no pocketbook is necessary and no assistants are required, except when the references are indexed against the original. An element of danger arises in the use of a shorthand writer. He may write down Newbury Library where it should be Newberry Library, and not discover his error. A plan much used in Washington is to write the references on cards or stiff paper and number them, without pasting.

Index Matter.—Matter pertaining to the index at the end of a work.

India.—A vast region in the south of Asia, comprising two great peninsulas and the country to the north for a long distance and inhabited by many nations and tribes. The population approximates two hundred millions. Many languages are spoken. Printing seems to have begun with the publication of a Tamil dictionary at Ambalacate by the Jesuits in 1679. Type in Tamil was sent by the King of Denmark to Tranquebar in the next century, and in 1714 the Four Gospels and the Acts of the Apostles were printed upon it. It was desired to finish the New Testament in this language, but paper was lacking, and the printers cast smaller type, so that fewer pages might accomplish the work. The metal was obtained from the leaden wrappings around some Cheshire cheeses, which had been sent to the missionaries from England. In 1719 the Testament was completed in this small type. Pondicherry, the capital of the French East Indies, had a printing-office in 1784. Calcutta did some printing for the Sanskrit scholar Charles Wilkins in 1778; the same year there was published at Hoogly Halhed's Grammar of the Bengal Language. Madras printed an almanac and a New Testament in 1772, and at Bombay printing was done in 1792. Before most of these places had begun, however, printing was executed at Colombo, on the island of Ceylon. It began there in 1737, and was in Singhalese.

The multitude of languages spoken in India has had a marked influence upon the extension of printing. No one of the languages was so important in comparison with the others as to exclude them from competition, and none had a circulation everywhere. Besides there was English, the language by which East Indians obtained access to the thought and knowledge of Europe, and in which laws and official regulations were first made known. Hindoostanee is the language of one hundred millions of people, and is next to Chinese and English in extent. It is spoken by all Mussulmans in India and by very many Hindoos, as well as all well-informed persons. The Lord's Prayer in Hindoostanee is:

Ai hamáre Bap, jo ásmán par hai, terá nám muqaddas ho. Terí bádsháhat áwe. Terí marẓí, jaisí ásmán par hai, zamín par bhí howe. Hamárí roz kí roṭí áj hamen̲ de. Aur hamáre qarẓ hamen̲ mu'áf kar jaise ham bhí apne qarẓdáron̲ ko mu'af karte hain̲. Aur hamen̲ ázmáish men̲ mat ḍál, balki burái se bacha; kyún̲ki bádsháhat aur qudrat aur jalál hamesha terá hí hain̲. Ámín.

Mahrattee is spoken by about six millions of people; Tamil by about ten millions; Telinga or Teluga by about fourteen millions. Besides these, printing is done in Bengalese, Assamese, Badaga, Baluchi, Bandelkhandi, Bikaniri, Chamba, Dogri, Gondi, Gujarati, Harotee, Hindi, Kachárí, Kanarese, Kanauji, Kâtchi, Khasi, Koi, Konkani, Kumaoni, Magadhi, Malayalim, Marwari, Mondári, Musalman-Bengali, Nepalese, Uriya, Pali, Palpa, Panjábi, Rájmaháli, Sanláli, Sindhi, Singhalese, Tulu and Ujaini. Some of these have many newspapers and publish a number of books annually. Besides the languages in the above list there is the Sanskrit, which is no longer spoken, but which bears the same relation to many of the newer tongues as Greek and Hebrew to English. It is the sacred language of India, and contains the books from which information must be sought upon early mythology and beliefs. The literature is abundant, compared with Hebrew. Pali, a more modern language, also contains much historical matter, but is less elaborate than Sanskrit. It is a sacred language. The written and printed characters of India are to a considerable extent drawn from Sanskrit forms, and the study of its ancient works is still much pursued by the natives, as it is in Europe, but for different reasons. See SANSKRIT.

The principal cities in which printing is done are Bombay, Calcutta, Madras and Lucknow. In the last-named place a Mahommedan publisher named Kishore employs twelve hundred men in printing and illustrating books. He issues hundreds in Hindoo, and many in Sanskrit, Persian, Arabic and English, besides the minor Indian tongues. A daily newspaper and numerous pamphlets are also produced, and nearly all of the materials, including even type and paper, are made at his charge.

Recent statistics show that there are 1,094 presses in India, 294 being in the Northwest Provinces and in Oude, 229 in Bengal, 228 in the British territory in Bombay and 20 in the native states; 200 in Madras, 71 in the Punjab, 26 in Burmah, 16 in the Central Provinces, and 10 elsewhere. The newspapers printed in English are 127, and in the vernaculars 277. The number of periodicals in India is 284, of which 102 are in English. The books printed in the vernaculars in one year were 7,990, and in English 734.

One hundred and seventy of the vernacular newspapers have a circulation of less than three hundred each; about one hundred have a circulation of from three to seven hundred copies; fifty publish between seven hundred and a thousand, and twenty-seven have a circulation of over a thousand. In the presidency of Bengal these papers flourish abundantly. There are over fifty-nine, twenty of which are published in Calcutta. A number of newspapers are published in English which are not conducted by Englishmen, but are written and managed entirely by natives, and reflect native views. Some of the most singular English ever written appears at times in the columns of these papers, abounding in curious infelicities and in uses of colloquial English for serious subjects and vice versa, but correct in syntax and etymology.

Paper is produced in the East Indies, but it is of the coarser kind. Most materials are obtained from Europe, although some of the commoner kinds are made there. Since the virtual discovery of Sanskrit by Sir William Jones, and the consequent impetus given to philological studies, many foundries in Germany, France and England have vied with each other in producing satisfactory representations of it. Many of the other faces have also been cast. In some the printing is done both in native characters and in Roman letters.

India Ink.—An ink used in drawing, of a very deep black. See INK.

India Paper.—Paper of a thick substance, but of very fine, silky texture and of a warm color; it seems to have the quality of imbibing ink much better than paper of any other description. It is not subject to mildew.

This paper is used for fine impressions by engravers, and is imported from China. It is called by the Chinese lehi, and is made from hemp, mulberry bark, cotton, bamboo, rice straw, barley straw, and from the interior membrane of silkworm cocoons. Sometimes the whole of the stalks of a year's growth are used. The pulp is mixed, after it has been prepared, with a given proportion of a vegetable gum called hotong in China. The paper is molded in molds made of fine bamboo filament. The sheets, sixty feet in length, which the Chinese are said to make, are supposed to be fabricated by artfully joining several small sheets at the moment of laying the paper. India paper, being too thin to bear handling or any strain, is mounted on vellum, which serves as a lining, and the white borders of which set it off. The sheets are kept in a dry place, and may be preserved for years.

India Proofs.—Artists' or engravers' proofs pulled on india paper.

India-Rubber Blanket.—A sheet of cloth faced with india-rubber, and used with mixed forms of old and new type, and at other times where ease in making ready rather than careful work is desired. See under MAKING READY.

India-Rubbered.—Books when interspersed with plates are sometimes coated at the back with india-rubber to save stitching or the expense of guarding. When open the book will lie perfectly flat. It should be noted, however, that after a time the rubber loses its elastic quality as well as its tenacity, and this binding is then of no value.

Indian Languages.—Two classes of languages are known under this name, those spoken in the East Indies and those spoken in America. The former are described with as much particularity as space will permit under INDIA, and what is here said will apply only to the languages of America. They differ widely from all of the tongues of the Old World. Balbi, in his Ethnographic Atlas, gives four hundred languages to America. One hundred and fifty of these are in North America, sixty in Central America, and one hundred and ninety in South America. He divides them into eleven classes. A study of these languages, however, has not been pursued actively by many philologists, and as a result our knowledge of them is extremely deficient. None of them was reduced to writing before the advent of Europeans upon these continents, and few now have more than one or two dozen books published in them, except the Aztec and the Quichua, the languages of the governing races in Mexico and Peru. Many glossaries have been compiled by missionaries in these different tongues. In the Cherokee language the achievement ascribed to Cadmus by popular history was repeated; George Guess, one of that nation, knowing no English, reinvented letters and introduced them among his tribe. This was in 1826. One book printed in the language of the Indians who dwelt in the Massachusetts Bay colony is justly regarded as a great feat of the early American press. It is Eliot's Bible. At auctions it brings a great price. The most powerful of the Indian nations which came into contact with the whites during the early period was the league of the Iroquois. These people lived in the centre and western part of the State of New York. The Lord's Prayer in the language of the Mohawks, the most eastern of these confederated tribes, is as follows:

Songvvaniha ne karongiage tigsideron: Wesagsando gegtiue; Saiaua ertsera ivve; Tagsere egniavvan karongiagon siniiugat oni ohvvonsiage; Niadevvigni serage tagkvvanaranon dagsik nonvva; Tondagvvari govi iugston ne iungvvarigvvannerre siniiugtoni siagvvadaderigvviugstonii; Nenni togsa davvagsarinet devvadadera geragtonge; Ne sane saedsi adagvvags ne kondig serohase.

In printing Indian languages the same words may be differently spelled, according to whether they were written down by German, French, Spanish or English travelers or missionaries. Most of the languages along the American great lakes were first reduced to writing by French priests, and their orthography differs widely from that employed by the English soldiers and hunters who afterwards visited the same regions.

Indiana was practically unsettled until about 1820. Printing began at Vincennes in April, 1804, by Elihu Stout, who brought out a newspaper entitled the Indiana Gazette. The office was burned in 1806, and that year Mr. Stout began another paper there entitled the Western Sun, which is still issued. Printing began at Fort Wayne in 1833, at Logansport in 1829, Connersville in 1826, Brookville in 1819, Corydon in 1814, Madison in 1815, Indianapolis in 1822, and New Harmony in 1825. The total number of newspapers in 1810 was 1; in 1840, 73; 1850, 107; 1860, 186; 1870, 293; 1880, 467, and 1890, 651. Of these 88 were daily and 465 weekly. There is no very large centre of printing, apart from newspapers. In both respects Indianapolis, the capital, is the chief city. The other principal cities are Lafayette, Fort Wayne, Evansville, Logansport, New Albany, Richmond and Terre Haute.

Indianapolis, a city of Indiana, was laid out on paper in the year 1821, being then designated as the capital of the territory. Previously there was no settlement. Several newspapers began shortly after, the publishers of the first, the Indianapolis Gazette, being George Smith and Samuel Bolton. While Indianapolis is not a great printing centre, there are a number of job offices, some of considerable size. Seven dailies and seventy-one other periodicals are published in the city.

Indice (Ital.).—An index or fist, as: ☞.

Indorse.—In England, the titles of legal documents or prospectuses which appear on the outside when folded. This word used as a noun is uncommon here. Americans say indorsement.

Indotint.—A print derived from a process invented by T. C. Roche of New York, and in which the plate, usually of copper, is roughened or pitted by exposure to the sand-blast, in order to cause the sensitive film to adhere tenaciously. Extra toughness and tenacity are also produced in the film by the addition of alcohol to the chromatized gelatine. After exposure under the negative the unchanged bichromate is washed out and the plate is dried. Plates thus made can be used in the power-press and one thousand copies an hour have been printed from them.

Industrial Co-operation.—That form of union of labor and capital in which all or nearly all of the workmen engaged in a manufacturing or mercantile enterprise are also interested as proprietors. The earliest example of this in printing since the business attained much magnitude was the sale of shares of New York Tribune stock by Greeley & McElrath to their employees; but in a smaller form it has been known more or less in various occupations since the beginning of the century. Ships were fitted out for whaling in New Bedford and Nantucket in which the shares were nearly all held by those who sailed in the vessels. Country stores, known as union stores, on this basis have been common since 1840. The modern form of co-operation, however, has been most marked in England. There some workmen in Rochdale more than forty years ago combined their earnings and established places for trade so that they might buy at the lowest rates. They and others have had success. A very large proportion of the trade of London in groceries is at the co-operative stores, where articles can certainly be purchased more cheaply than at the ordinary tradesman's. These trading associations, when of any size or in cities, have nearly all proved failures in America. Those which have been successful were small or in the country, where it was possible to watch the persons who conducted the trade. Manufacturing enterprises have done better, as the margin of profit that they yield has been greater and the rewards offered to diligence and care have been more palpable. The whole number, however, which has thus been profitable is small. There is, it is true, an exception to this in joint-stock financial enterprises. These consist of an accumulation of the savings of the many, and once a year the participants have a voice in the choice of directors. It is not too much to say, however, that an ordinary stockholder in a railroad, rolling-mill, cotton factory or iron mine has no accurate knowledge of the condition of affairs, and he has no power to rectify an abuse if he sees one. The board of directors is composed of the largest stockholders, and it does as seems best to it, the smaller stockholders receiving scant consideration. This class of enterprise is usually excluded from consideration, however, by those who talk about co-operation. An example of industrial co-operation which would be considered a true one by the friends of this cause would be eight, ten or more workmen joining together to do some manufacturing, each putting in five hundred or a thousand dollars. Theoretically speaking, if the men drew out for living only ordinary wages and attended to business they should make money. They are generally men of more intelligence and more capacity than others, else they would not have the money to invest. It is too frequently the case that bickering begins with the business. One must lay out the work for the day and another attend to money matters. Frequently from lack of business experience the last is done badly. Materials are purchased at high rates, and contracts are taken at too low figures. Then there are times when goods are not paid for, or when through some miscalculation much is left on hand which should have been sold in the season. Many men are excellent workmen who cannot lay work out well for others or succeed in getting a maximum production from each hand. These causes together usually compel some to drop out from the enterprise, and if it is at all successful the leaders take more stock. Gradually the number diminishes to a half dozen, and then to two or three, when the whole business is on the footing of any other. It is possible that the conflict between capital and labor, now going on, may in the end be solved by some form of industrial co-operation—not, however, that form in which the smaller stockholders are to be consulted as to the conduct of the business. They will receive its profits and remain constant to the place where they have obtained employment.

Inferior Figures.—Special figures cast or made to range at the bottom of a letter, thus: $_1\ _2\ _3$. One use of these is in chemistry.

Inferior Letters.—Small letters which are cast on the lower part of the body, as: ..i..; the reverse of superior letters.

Ingram Machine.—A rotary machine, manufactured in England, named after the late proprietor of the Illustrated London News.

Inhalt (Ger.).—Contents.

Inhaltsverzeichniss (Ger.).—Table of contents or index. The Germans do not rise to a conception of the difference between the two any more than the French, who call each table des matières.

Inicial (Sp.).—Initial (letter).

Initial Letters.—Following the example of the calligraphers the first printers left blanks for the initial letters of chapters and books, which were to be filled up with pen or pencil. Afterwards a skeleton letter covering the space was sometimes printed, also designed to be added to. In the former case a small letter was often printed so as to indicate to the scribe or illuminator what was needed. Sometimes the small letter was written in. The monks preferred to have these spaces left blank in the religious works which they bought, as there were nearly always several expert illuminators in the convent whose labor would cost nothing, while if done by the printer a charge must be added. In 1475 Erhard Ratdolt of Venice began to use wood-cut initials, thus preceding all others. They were known as literæ florentes, lettres tourneures and typi tornatissimi by different persons, but were not generally adopted until the close of that century. Caxton introduced them in some of his works. The large and elaborate initials used shortly after were known as lettres grises. They were engraved either on wood or metal, and answered not only as initials, but, when circumstances permitted, as ornaments elsewhere. What are known as "two-line letters" to-day then came into use. Other letters also were used for this purpose. Two hundred years ago the large, highly ornamented initial letters used at the University Press, Oxford, were known there as Dutch Bloomers, from the word sounding something like this which in that language signifies flowers. Pierced initial ornaments came into use about the same time. These were wooden blocks having a centre opening or mortise, around which were many ornamental arrangements—a landscape, a group of flowers, an assemblage of faces. This centre was reserved for a single letter, which was justified and wedged in. When typefounding revived in England, Caslon, Baskerville and their contemporaries paid no attention to these great initials, and confined their attention to plain two-line faces, Roman and Italic. Since the beginning of the present century, however, great numbers of initial letters of a more ornamented type have been made by European and American founders, as well as devised for the use of publishers by artists who have no connection with a typefoundry.

Initier un Apprenti (Fr.).—To instruct an apprentice in his calling.

Ink.—A substance used to mark upon paper or other material. It is of two kinds, writing and printing ink. The latter consists of a pigment held in a fluid solution which gradually dries and leaves a more or less legible impression upon the paper. The writing-ink of the ancients was essentially different from that now employed. Its basis was finely divided charcoal mixed with a mucilaginous or adhesive fluid; it was much less easily destroyed than modern writing-ink, and much resembled printer's ink both in the nature of its coloring ingredient and in its indestructibility. Writing-ink is now a chemical compound, and not a mere mechanical mixture. Its basis is proto-gallate and proto-tannate of iron, which by oxidation becomes per-gallate and per-tannate, and it is owing to the oxygen of air effecting this change gradually that recent writing is of a comparatively light color and subsequently becomes black. The common ingredients are nutgalls and sulphate of iron; in fact, while printer's ink may be regarded as a black paint, common writing-ink may be regarded as a black dye. Brande's Dictionary gives as a good recipe: Aleppo galls, bruised, six ounces; sulphate of iron, four ounces; gum arabic, four ounces; water, six pints. Boil the galls well in the water, then add the other ingredients, and keep the whole in a well-stopped bottle, occasionally shaking it. In two months strain and pour off the ink into glass bottles, which must be well corked. To prevent mould, add one grain of corrosive sublimate or three drops of creosote to each pint of ink. In making good writing-ink the great object is to regulate the portion of sulphate of iron to the galls. If this should be in excess, although the ink may at first appear black, it will subsequently become brown and yellow. Gum is added to retain the coloring matter in suspension, to prevent too great fluidity in the writing, and to protect the vegetable matters from decomposition. Many other substances are used for making ink.

When writing has through age become yellow and indistinct it is because the vegetable matter has decayed and mere rust or peroxide of iron is left. By carefully applying infusion of galls the writing may be rendered blacker and more legible. This method was successfully adopted in deciphering the manuscript of Gaius, a work on Roman law which attracted great attention among learned men in Germany shortly after the beginning of this century, and which for a long time resisted all attempts to decipher it. Modern writing-ink, unlike the ancient, is readily destroyed by chlorine, acids and alkalies. Indeed if the paper has been made with an excess of any of these things it very likely will act upon the ink, which, however good, will in time become discolored. Blue writing-ink is now much used. It is sometimes made from indigo and sometimes from prussian blue as a basis. Aniline inks also find extended use. They write more freely than the old-style inks, and can be obtained of almost all colors. They are, however, fugitive. It is claimed that this is not so with the best kinds, but sufficient time has not elapsed since their use began to test the truth of the assertion.

India ink is made in cakes from lampblack and size or animal glue, with the addition of perfumes or other substances not essential to its quality as an ink. It is used in China with a brush, both for writing and painting. It is employed in Europe and America for designs in black and white, in which it possesses the advantage of affording various depths of shade, according to the degree of dilution with water. Our common lampblack is not sufficiently fine for the purpose. Fluid india ink can now be purchased at the stores in very small quantities. This ink is blacker than any other ink, and is especially adapted for use in photo-illustration, where only really black ink is available. Blue, brown and violet inks take badly.

Marking-ink is employed for marking linen. It is a solution of nitrate of silver, written with a pen upon the fabric to be marked, after the latter has been moistened with an alkaline solution, as potash or soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any re-agent which does not also destroy its texture. This ink can also be used without moistening, but not so perfectly.

Sympathetic inks are such as are invisible until heat or some wash is applied, and the writing then becomes visible. There are many varieties. Copying-inks are such as will allow letters to be placed in a press and then afford a copy without rewriting. Of these there are also many varieties. Ink powder is made by mixing the ingredients in a dry state and adding cold or boiling water in certain proportions when required for use. PRINTING-INK is treated under that head.

Ink Block.—A receptacle for ink when first taken out of the keg. With a wooden hand-press it was made of beech, in length thirteen inches, depth four inches, and width nine inches.

Ink Brayer.—A small wooden implement for rubbing out the ink on the table. See BRAYER.

Ink Cylinder.—The revolving iron roller in the ink ductor which imparts a given quantity of ink to the vibrating roller.

Ink Ductor.—The receptacle similar to a trough which holds the ink at the end of a machine.

Ink Fountain.—The ductor of a machine is generally thus called in America.

Ink Knife.—The long blade in the fountain which regulates by means of keys the amount of ink to be given at each impression. It is also the knife by which ink is taken out of the package and laid upon the ink block or the brayer of a hand-press.

Ink Muller.—A wooden implement used for rubbing out the ink on the table.

Ink Photos.—This name is given by Sprague of London to photolithographs in half-tone, prepared by a process which is kept secret. The pictures do not show the decided dotted character of the Meisenbach negative, but are very fine grained and soft.

Ink Slab.—The table on which ink is distributed.

Ink Slice.—A small iron implement used for lifting ink out of cans.

Ink Solvent.—A wash for cleansing type.

Ink Table.—The surface on which ink is distributed.

Ink Up.—To run up color on the rollers, or to coat press-rollers with a coarse preservative ink when they are out of use.

Inkers.—The large rollers on a printing-machine which apply the ink to the type.—*Jacobi.*

Inking Apparatus.—The parts of a hand-press or machine applied for inking purposes.

Inkoleum.—A patent liquid used with ink for thinning purposes or to facilitate drying.

Inlaying.—Plates, illustrations, &c., too small for a book can be inlaid into margins of any size, taking the place of mounting. This work can be so neatly done that the difference between these and the other leaves is scarcely perceptible.

Inner Form.—The pages of type which fall on the inside of a printed sheet in sheet-work; the reverse of the outer form; the second and third pages of a folio newspaper.

Inner Tympan.—The reverse of the outer tympan; the side which is lifted to place the sheets in.

Insertion.—Copy left out by accident, or additional words or copy supplied by an author, is thus termed. In a newspaper, one insertion is to publish an advertisement once and two insertions is to publish it twice.

Inset.—When one sheet is laid inside of another, both being folded. Thus the supplement to daily newspapers is often an inset between the fifth and ninth pages. In book imposition an inset is equivalent to an offcut, as the supplementary leaves must generally first be cut off before they can be set in. Sometimes, but erroneously, this is called an insert.

Inside Quires.—The good quires of a ream; distinct from outsides.

Inside Reams.—Good and selected paper; applied more especially to drawing or hand-made papers of 480 sheets; mill reams of 472 sheets contain top and bottom outside quires.—*Jacobi.*

Instructeur (Fr.).—Teacher.

Intaglio.—Engraving so executed that the lines are hollows, in opposition to relief work. The latter is that used in wood-engraving. Each line intended to be printed stands up above the hollows, but in intaglio printing only those lines give an impression which are below the surface. The top does not print.

Inter.—Abbreviation used in the reading department for note of interrogation.—*Jacobi.*

Intercalare (Ital.).—An intercalation.

Interchangeable System.—That system of casting type by which a line of long primer and one of pica are exactly equal in depth of body to two lines of small pica, or a line of nonpareil and one of pica are equal to two lines of bourgeois. With type as formerly cast this could rarely be done. Two lines of ordinary small pica are larger than a line of pica and one of long primer, and the same is true of a line of pica and one of nonpareil compared with two lines of bourgeois. The interchangeable feature has been gained by making each size a multiple of a very small measure of magnitude, called a point. Nonpareil is six times as large, bourgeois nine times, long primer ten, small pica eleven and pica twelve. Each of the other old sizes has now definite magnitudes. Suppose that a space to be filled is fifty-five points. This can be done with four lines of pica and one of minion; five of small pica; five of long primer and one of pearl; five of bourgeois and one of long primer; six of brevier and one of minion; seven of minion and one of nonpareil, and eight of nonpareil and one of minion. See STANDARDS OF TYPE.

rleaved.—When wood-cuts are printed they are
heeted to prevent set-off. A boy stands at the
y-board of a press, and as fast as one sheet is de-
he lays another sheet upon it. Such sheets
be of a different size and paper, so that they can
acted without difficulty. An extra charge is made
ı.

rligner (Fr.).—To lead.

rlinear (Sp.).—To lead (matter).

rlinear Matter.—Small type of an explanatory
between lines of larger character.

rlinear Translations.—Lines so spaced that
nslation will be directly under or over the corre-
ıg word of the text. It is usual to put the text
ər type than the translation. In cases where three
ıf languages must be shown, the text can be in a
ype and the translations in small type, one in Ro-
ıd one in Italic. A third can be in small capitals
ized, a fourth in Italic small capitals capitalized,
lfth in capitals of a still smaller size, but not small
ı to be of the same size of face as the small capi-
ewhere. Two plans are used in justifying. One
ət the main line first, estimating roughly by the
w the size of each word will compare with those
irst translation. Spaces and em quadrats are put
the line is not properly spaced. The next lan-
is then set, adopting the same precautions, and so
he last. When all are done the words which need
lest space in translating another word are given
ze, and then the others. The line which takes the
ı sets the gauge for the others. For instance,
meinen Sie?" in German is shorter than the cor-
ling English, "What do you mean (say)?" and
uently the sentence as last given must be allowed
ɔe, and the other will have too much; but suppos-
ɔ be translated literally a mark of transposition
e used, for the words do not follow the same order.
done by figures over the top, which must also go
in the centre of the words to which they refer,
w:

ıuelle époque a eu lieu leur ar-
what epoch has ^{1}had (was) pla^{4}ce (placed) the^{2}ir ar-
,

figures take the centre of the words "has had,"
," "their" and "arrival." The other method is to
ɔr example, English in Roman and Latin in Italic
same size of type. The matter is thus set up:

es all *vici* the villages *atque* and *omnia* all *ædi-*
ıe buildings, *quæ* which *quisque* any one.

double line is set, as near as may be; then the
s picked out, compared with the English words
iately following, and calculation made for the
It can soon be ascertained what the exact spac-
ɔuld be. Thus it appears when finished:

es *vici* *atque omnia* *ædificia,* *quæ*
the villages and all the buildings, which
ɜ.
ə.

ımber of examples of interlinear translations can
ı throughout this work, as for example under
H LANGUAGE.

rlineare (Ital.).—To lead.

rlineas (Sp.).—Leads.

rlinee (Ital.).—Leads.

rnational Copyright.—Under the head COPY-
will be found the law enacted in 1891 by Congress,
as the general reasons for copyright. The enact-
ıowever, was made only a few days before that portion of this work which contained that article passed through the press, and no previous reasoning could determine what effect it would have upon the bookmaking trades. The agitation to secure rights to foreign authors began as far back as 1837 when Henry Clay presented the address of the English authors to the Senate. A bill was prepared which limited its beneficial features to authors of the United Kingdom and France, and required reprinting here. It was repeatedly presented between that time and 1842 by Mr. Clay. After his decease in 1852 the struggle was continued by Charles Sumner, and the text of a treaty which incorporated international copyright was, by the exertions of Edward Everett, then Secretary of State, laid before the Senate. At about the time Charles Dickens revisited this country, in 1867, interest was revived, and in 1868 the International Copyright Association was formed. In 1872 the question was first debated in Congress, and it came up nearly every session after that until 1883, when the American Copyright League, composed of authors and publishers, was formed. The Chace bill was the twelfth and last introduced. Its author was Jonathan Chace, Senator from Rhode Island. It was offered on January 21, 1886, was discussed, amended, postponed and lost sight of repeatedly. Mr. Chace saw that he must enlist on his side the material support of all bookmakers, and his bill was framed so as to give the most ample protection to them. It was finally passed on March 4, 1891, to take effect on July 1 of the same year. It required great exertion upon the part of those who were interested, and delegations from the printers, the authors and the publishers were almost constantly in attendance during the two sessions next prior to the enactment.

The act was asked for on the ground of justice to the foreign author, a right so indisputable that nothing further need be said upon this subject. It strengthened the American publisher, as he would then be in a position to know what he could offer a British author, without fear of having another American edition in competition with his which would destroy his profits. A popular book has sometimes been reprinted by five or six firms at once. It would increase the quantity of his business, as there are many books written in England which circulate more largely here than there, and which ought first to be published here, as this is the larger market. This is especially true of dictionaries and encyclopædic books. Ten thousand copies only were sold of the last edition of the Encyclopædia Britannica in England; forty thousand of the authorized edition were sold here. If these books were copyrighted in America it would be more convenient to make them on this side, and this would increase the publisher's business. The author would be benefited, as his work might then be sold in both countries, and he would be especially benefited if a novelist or a writer of light books, because the former competition would be removed. No publisher will pay five hundred or a thousand dollars for a volume of sketches or travels or a novel when he can get one as good for a couple of dollars. Great Britain now supports two hundred novelists; the United States not one, unless the matter is furnished to a periodical. The printer and vender are benefited, because if the publisher issues more volumes they must prepare them. The type must be set here, the paper and ink manufactured, and the covers put on. With prosperity to the manufacturers, it is natural that publishers shall be able to offer to authors better terms and a greater variety and quantity of work. It would naturally seem that America would be the country where works of science and research should be printed, as here they are most largely sold and studied. In all branches of physical science the reputation of Americans stands as high as in the mother country, and the only classes of writing in which inferiority is to be noted are belles-lettres, the classics and philology. The equipment, however, of our colleges and universities has been wonderfully strengthened within a few years, and it is probable that within a score of years we shall be on an equality with England in all matters except in knowledge of the languages of India, in which her governmental control enables her to take precedence, and in the text of Greek and Latin writers, which will be cultivated by her in deference to old tradition. We may reasonably look for the publishing centre of the world to be New York long before that city reaches the population of London. So far the new law has not affected the manufacture of books materially in the United States, and progress in this direction will doubtless be slow, although sure.

The essential changes in the new copyright laws are not numerous. Former laws provided that no citizen of a foreign state or nation should be protected by American copyright. They made no restrictions as to the country where the printing of books covered by copyright should be done. The new laws permit foreigners to take out an American copyright on the same basis as American citizens in two cases: First, when the nation of the foreigner permits copyright to American citizens on substantially the same basis as its own citizens; second, when the nation of the foreigner is a party to an international agreement providing for reciprocity in copyright, by the terms of which agreement the United States can become a party thereto at its pleasure. The existence of these conditions is to be determined by the President of the United States by proclamation. The new laws require that all books copyrighted under them shall be printed from type set within the United States, or from plates made therefrom. In the case of photographs protected by American copyright the negatives are to be made in the United States, and in the case of lithographs or chromos the drawings are to be executed in the United States. The importation of foreign editions of books covered by American copyright is prohibited. A book within the statute need not be a book in the common and ordinary acceptation of the word, viz., a volume made up of several sheets bound together; it may be printed only on one sheet, as the words of a song or the music accompanying it. The literary property intended to be protected by the act is not to be determined by the size, form or shape in which it makes its appearance, but by the subject matter of the work. Nor is this question to be determined by reference to lexicographers to ascertain the origin and meaning of the word book.

Records must be kept by the Librarian of Congress, and the books received are to be part of the library. The librarian must make an annual report of the transactions of his office in relation to copyright. Each copyright shall be assignable, and the instrument must be recorded. If the book required by law is not deposited the proprietor of the copyright shall be liable to a penalty of $25. No one can maintain an action for infringement of copyright unless notice of copyright is printed on the first page of every book or upon its reverse. Unauthorized representation of a copyrighted dramatic composition may be punished by a penalty of $100 for the first and $50 for each subsequent publication. No action can be maintained in the courts for forfeiture or penalty unless it shall be begun within two years after the cause of action arises.

International Typographical Union.—An organization of journeymen printers extending throughout the United States and the British dominions north thereof, having for its object the assistance of each other and the maintenance of a just rate of wages. The present society only dates from 1869, having been preceded by the National Typographical Union, organized in 1852, and that again by the Printers' National Union, beginning in 1850. It is now one of the oldest and strongest trades-unions in America. A typographical society existed in New York in the year 1795, answering some of the purposes of a union, and in 1800 it prepared a scale of prices. It died out before 1805, and the New York Typographical Society, then a trades-union, succeeded it in 1809. Philadelphia had a society on the same lines in 1802, Washington in 1814, and Boston and Albany very early; but these societies, although actuated by the same feelings, did not appoint delegates to a central body. The first common action of the journeymen printers of the United States was in resistance to Duff Green's proposed college for boys, in which manual labor and instruction were to be mixed. This was in 1834. In 1837 a convention of printers was held at the City Hall in New York. Delegates were present from many cities. It is not known what action was taken or who the officers were. The societies mentioned above and others existed until 1850, and indeed some of them are still maintained; but most had become purely beneficial and benevolent societies, and did not answer the purposes of the union of to-day. Several attempts were made to change the conditions of things, but they were ineffectual, and the societies disappeared or changed in character. Typographical Union No. 6 of New York is the fifth trades-union which has existed in that city, its immediate predecessor, the Franklin Typographical Association, lasting from 1828 until about 1844.

Unions were established almost simultaneously in New York, Philadelphia, Boston and some other cities at the end of 1849 or beginning of 1850. They naturally felt that their condition would be improved by co-operation, and the three societies named joined in issuing a circular urging the formation of other societies and the sending of delegates to a national convention of journeymen printers in New York on December 2, 1850. Delegates from New York, New Jersey, Pennsylvania, Maryland and Kentucky assembled on that day at Stoneall's Hotel and organized by the election of John F. Keyser of Philadelphia as temporary chairman, and Franklin J. Ottarson of New York as secretary. The permanent organization chose John W. Perogoy of Maryland as president, George E. Greene of Kentucky and M. C. Brown of Pennsylvania as vice-presidents, and F. J. Ottarson of New York and John Hartman of New Jersey as secretaries. A code of seven propositions was prepared. In it were recommended the adoption of traveling certificates, regulation and adjustment of the various scales of prices, so that they shall not interfere with each other; keeping a registry of rats, the accumulation of a reserve fund, and receiving no one in any society who could not bring a certificate from the place he had left. An executive committee was formed to put these ideas into operation, so far as possible.

At the second meeting held in Baltimore in the year 1851 there were delegates from eight States. The name was changed from the Printers' National Union to the National Typographical Union, and resolutions were adopted recognizing this national body as the supreme legislative head, and providing that all unions thereafter established should be by authority and virtue of a grant from the National Union. At the Cincinnati meeting the next year the new title was assumed. Lots were cast for precedence, as the unions were to be numbered. Indianapolis became No. 1, Philadelphia No. 2, Cincinnati No. 3, Albany No. 4, Columbus No. 5, New York No. 6, Pittsburg No. 7, St. Louis No. 8, Buffalo No. 9, Louisville No. 10, Memphis No. 11, Baltimore No. 12, Boston No. 13 and Harrisburg No. 14. At the next meeting in Pittsburg a new feature came up. J. A. Smith of New York presented the petition of the New York Co-operative Union for a charter. It was composed of more than three hundred book and job printers. He declared that No. 6 did not embrace one-tenth of the workmen in New York, and that nine-tenths of this tenth were morning newspaper workmen, ignorant of the wants of the book and job hands. The application was refused, as it would be establishing a dangerous precedent; two societies might exist in one place, conflicting with one another. In 1861 no session was held on account of the secession of the Southern States.

Upon examination of the questions which came up before this body in its earlier years they will be found to be much the same, allowing for differences in the situation, as those now debated, excepting a shortening of the hours of labor. That was not then spoken of. The abolition of the contract system and the limitation of boy labor were as prominent as any subjects which were discussed.

In the cities the membership was then chiefly among the morning newspaper printers, and the largest society did not number over four hundred members. Only about twenty unions were really alive, and many of these had a very small membership. The Civil War injured these societies badly. In the strikes which followed the increase of the price of necessaries the journeymen were frequently beaten, and their organizations were in many cases given up. In 1863 a meeting was held at Cleveland, and another at Louisville in 1864. In June, 1865, they met at Philadelphia, where a resolution was offered recommending subordinate unions to so amend their scale of prices as to constitute eight hours a day's work. The body declared that this was inexpedient. The next meeting was in 1866, at Chicago, delegates being present from the States lately at war with the United States. From this time onward unionism has been steadily gaining, taking the whole country together, although having times when there were many suspensions of subordinate societies. Up to about this time union men and non-union men worked freely together in all book and job offices, but the institution of chapels, chairmen and working-cards gradually accomplished a great change. All members of the union after this time were obliged to carry with them a card containing a permission from the local society for them to work within its jurisdiction and showing to what time dues had been paid. Not to have such a card was evidence that the compositor was not a member of the union. Gradually most large offices in the United States became subject to the control of the society. Local societies aided each other in strikes and in other matters, which they had not done before, and discipline became much more strict. As the members controlled the work in many offices, it was necessary for printers who desired to work in them to join the subordinate unions, and the list was in consequence very much strengthened. It is doubtful whether all of the union printers in the United States before the war numbered two thousand out of a total of about thirty thousand. In New York there were not more than four hundred in good standing. At present there are over four thousand in that city, and the total in the United States and the British dominions is about thirty-three thousand. These numbers are out of a total of about eight thousand five hundred printers in New York, and one hundred and ten thousand in the two countries embraced in the area of the International Union. It is not likely that the proportion will ever be much greater, as in the small towns there is no incentive to belong to a printers' society, and even in the large cities there are many offices where no question is ever asked concerning the relations of the men to the union, and where the men do not belong to it. Compositors are very quickly taught, and for ordinary work can be obtained in almost any number, thus preventing any marked disproportion in the prices of labor in cities of about the same size, as if prices should be unduly high in any one workmen would gravitate thither, a surplus would soon be created and the usual law of competition would reduce wages.

In 1869 the scope of the National Union was enlarged so as to take in the Canadas and maritime provinces, and the name of the society was changed to the International Typographical Union. No change was made otherwise. Much irregularity in prices had existed since the beginning of the war, and when the veterans returned in 1865 there was a surplus of workmen. All kinds of business were, however, carried on with great vigor, and there were many speculative projects. As a result the quantity of printing was largely increased, and the overplus of workmen did not at once show itself. Prices were exceedingly high, and many proprietors after a while sought to exercise economy by employing low-priced help and female labor. As a result a large number of offices were lost. A vigorous effort was made to get them back, and the president of the National Union, Robert McKechnie of New York, issued the following proclamation:

NATIONAL TYPOGRAPHICAL UNION,
OFFICE OF THE PRESIDENT, No. 82 Beekman Street,
NEW YORK, August 21, 1868.

PROCLAMATION.

To the Typographical Unions under the jurisdiction of the National Typographical Union:

In accordance with and by virtue of the power vested in me at the last session of the National Typographical Union I hereby issue this Proclamation of Amnesty to All Printers (whether expelled, suspended or otherwise punished for faults committed) within the jurisdiction of the National Typographical Union who shall, within the time hereinafter specified, make application in due form, accompanied by the usual initiation fee of the subordinate union within whose jurisdiction the applicant may at the time of such application reside; and it shall be the duty of said subordinate union to elect such applicant to membership without regard to his past record, or without any fine, pain or penalty whatsoever, other than the initiation fee aforesaid.

This amnesty shall go into effect on the first day of September, 1868, and continue in full force till the first day of December, 1868, in all subordinate unions, except those on the Pacific Coast and in the Territories, where it shall take effect immediately on its reception, and so continue for three months thereafter.

All charges pending against members on the date of this amnesty going into effect shall be quashed, unless the accused member desires an investigation, in which case his trial shall proceed, and if found guilty he shall be excluded from the benefits of this amnesty.

Charges preferred against members after the date aforesaid, viz., the first day of September, 1868, shall take the usual course; and the accused parties, if found guilty, cannot claim exemption from punishment or reinstatement under this amnesty.

All laws or portions of laws, whether of the National Union or subordinate unions, that may be construed as conflicting with the carrying out of the provisions of this amnesty are hereby suspended for and during the period aforesaid.

To the end that the object contemplated by the National Union in ordering this amnesty may be fully accomplished, it is hereby made the duty of each subordinate union to give the fullest publicity to the same throughout its jurisdiction.

It is also made the duty of the proper officers of all subordinate unions to keep a correct record of the number of printers admitted to membership under this amnesty, and forward the same to the secretary and treasurer of the National Union immediately after the expiration of said amnesty.

In witness whereof, I hereunto set my hand and
[Seal] the seal of the National Union this twenty-first
day of August, 1868.

JOHN COLLINS,
Secretary and Treasurer.

R. McKECHNIE,
President.

This proclamation produced some beneficial results, but the desire for economy was still very strong, and when the panic of 1873 came on prices were lowered little by little all over the country. In 1870 they were at their maximum; in 1873 they fell, and the decline continued until about 1881. During the two or three years nearest to 1880 they were the lowest, measured by purchasing capacity, ever known in the history of America. At present they are at the highest. Taking New York for an example, prices are found to be in 1800, seven dollars a week; 1809, eight dollars; 1820 to 1840, nine dollars; 1840 to 1850, ten dollars; 1852 to 1862, eleven dollars; 1862, twelve dollars; 1863, fourteen to fifteen dollars; 1864, eighteen dollars; 1865, twenty dollars; 1866, twenty to twenty-two dollars; 1870, twenty dollars; 1873, eighteen dollars. The same rate is continued to the present time. The articles which are now higher than before the war are butcher's meat, fish and rent. Most other articles are as low as they were forty years ago, and some much lower; taking these things altogether a week's wages will buy more than at any former period.

The prominent questions which have been before this society during the last few years have been somewhat the same as those at the beginning. Then offices were small and the men were brought into intimate contact with their employers; but of late years printing-offices have largely been carried on like manufactories, the employers not knowing their men by sight, and the men having no dealings with the masters except through committees, often of strangers. Thus the question which is the most important with them to-day is that of discipline, so that effective force can be applied when employers resist. In many offices no one can be employed who is not a member of the union; in many others a non-union man is at a disadvantage. Every member is known to the local secretary, and many secretaries, from having this knowledge, are applied to when extra compositors are wanted. Offices which are not under the control of the union are interfered with when they have important contracts on hand, as, for instance, directories, which must come out within a certain time. Should such withdrawal of hands prove successful, the only method of getting the work out promptly is to come to terms with the union, and that means employing only union men in the future. At present organization of State unions is going on, so that all of the sources of supply may be reached.

Lately the union has received a gift of a considerable sum of money from George W. Childs and Anthony Drexel. This gift has been much enlarged by other individuals and by the various local unions, and has resulted in the establishment of a beautiful asylum at Colorado Springs, Col. The home was opened on May 12, 1892. See HOME FOR PRINTERS.

The principal questions in which the International Union is now interested, besides that of organization, which insures attention to its demands, are the shortening of the hours of labor, the enhancing of the price paid to that labor, and the more equal distribution of work. It is claimed, for instance, if in a certain city there are a thousand compositors, of whom one hundred are generally unemployed, that by cutting down hours to nine a demand would arise for the unemployed, and all could then be at work. To a great extent this equalization of labor has been carried out on morning papers. It is believed, too, by many unionists that if workmen would stand together hours could be cut down in the great cities, and concessions thus made would be followed by similar ones in the smaller places. They claim this reduction as a matter of justice, alleging that when the cities were small workmen could reach their places of employment within a quarter of an hour from the time of leaving their homes, but that now the time averages more than an hour. The former time, including coming and going, was ten and a half hours; the present time is twelve and a half. They refuse to believe the employers who tell them that their work will go away to other cities if hours are shortened; and they also disbelieve any statements that customers will curtail the amount of their orders because the price is higher for a certain quantity. Many resolutions have been passed by them upon the apprenticeship question, but little has been done, either by them or the employers, to see that boys are really taught their trade. The International Union originally only embraced printers, both compositors and pressmen, but almost their entire membership was of compositors. Afterwards unions were organized among the pressmen separately from the others, and later among the stereotypers and electrotypers, the feeders, the folders, and lastly the reporters. The pressmen have generally seceded, forming a new international union, but in the larger cities there are frequently both organizations. By the report of the proceedings at Boston in 1891 there were nominally 293 typographical unions (compositors), 45 pressmen's unions, 18 of stereotypers and electrotypers, 1 of stereotypers' helpers, 10 of press-feeders, 5 of bookbinders and 2 of type-founders. From this list, however, must be abstracted as dead, no delegates having been sent or returns made, 20 typographical unions, 29 pressmen's unions, 3 of stereotypers, 6 of press-feeders, 3 of bookbinders and 1 of type-founders. The total membership was 33,704, and the amount of dues received by the subordinate unions was $219,085.53. The largest societies were the New York, with 3,840 members; Philadelphia, 1,100; Boston, 1,074; Chicago, 1,250; Washington, 1,250; Albany, 577; Pittsburg, 595; Cincinnati, 578; Detroit, 462; Baltimore, 387; San Francisco, 753; St. Paul, 456; Denver, 425; Toronto, 508; German-American of New York, 380; Pressmen's of New York, 459. The average membership of a union is 105, but this is occasioned by the great size of some; most of the societies number less than 25. The number of strikes during the year had been 47, and the number of men involved 1,189. Their cost had been $19,039.78. The total receipts of the International Union for the twelvemonth had been $35,747.90.

The following is a list of the places at which the annual conventions of the International Union and its predecessors have been held, and the name of the president then elected:

1850—New York	J. W. Peregoy, Baltimore.
1851—Baltimore	J. L. Gibbons, Louisville.
1852—Cincinnati	J. S. Nafew, Albany.
1853—Pittsburg	Gerard Stith, New Orleans.
1854—Buffalo	Lewis Graham, New Orleans.
1855—Memphis	Charles F. Town, New York.
1856—Philadelphia	M. C. Brown, Philadelphia.
1857—New Orleans	William Cuddy, St. Louis.
1858—Chicago	R. C. Smith, Philadelphia.
1859—Boston	R. C. Smith, Philadelphia.
1860—Nashville	John M. Farquhar, Chicago.
1861—No session.	
1862—New York	John M. Farquhar, Chicago.
1863—Cleveland	Eugene Vallette, Philadelphia
1864—Louisville	Addis M. Carver, Cincinnati.
1865—Philadelphia	Robert E. Craig, St. Louis.
1866—Chicago	John H. Oberly, Cairo.
1867—Memphis	John H. Oberly, Cairo.
1868—Washington	Robert McKechnie, New York.
1869—Albany	Isaac D. George, Nashville.
1870—Cincinnati	W. J. Hammond, New Orleans.
1871—Baltimore	W. J. Hammond, New Orleans.
1872—Richmond	W. J. Hammond, New Orleans.
1873—Montreal	W. R. McLean, Washington.
1874—St. Louis	William H. Bodwell, New York.
1875—Boston	Walter W. Bell, Philadelphia.
1876—Philadelphia	John McVicar, Detroit.
1877—Louisville	Darwin R. Streeter, St. Louis.
1878—Detroit	John Armstrong, Toronto.
1879—Washington	Samuel Haldeman, Washington.
1880—Chicago	William P. Atkinson, Erie.
1881—Toronto	George Clark, St. Louis.
1882—St. Louis	George Clark, St. Louis.
1883—Cincinnati	Mark L. Crawford, Chicago.
1884—New Orleans	M. R. H. Witter, St. Louis.
1885—New York	M. R. H. Witter, St. Louis.
1886—Pittsburg	William Aimison, Nashville.
1887—Buffalo	William Aimison, Nashville.
1888—Kansas City	Edward T. Plank, San Francisco.
1889—Denver	Edward T. Plank, San Francisco.
1890—Atlanta	Edward T. Plank, San Francisco.
1891—Boston	William B. Prescott, Toronto.
1892—Philadelphia	William B. Prescott, Toronto.

Those who have filled the office of secretary and treasurer for the same time have been:

1850, F. J. Ottarson and J. Hartman; 1851, H. A. Guild, treasurer; M. F. Conway, secretary; 1852, G. H. Randall, treasurer; R. R. R. Dumas, secretary; 1853, M. C. Brown, treasurer; H. H. Whitcomb, secretary; 1854–57, H. H. Whitcomb; 1858, George W. Smith; 1859–63, Thomas J. Walsh; 1864–65, William F. Moore; 1866–67, Alexander Troup; 1868–1873, John Collins; 1874–75, W. A. Hutchinson; 1876–77, John H. O'Donnell; 1878–79, William White; 1880–81, William H. Trayes; 1882, Mark L. Crawford; 1883–84, William Briggs; 1885, E. S. McIntosh; 1886, D. M. Pascoe; 1887-1892, W. S. McClevey.

Interpunction.—The same as PUNCTUATION, which see. The word is rarely used.

Interpunktion (Ger.).—Punctuation.

Interrogation.—A mark (?) to indicate a question. It is used at the end of an interrogatory, but in Spanish is also used in an inverted position at the beginning, as we might do in a sentence like this: ¿ Who is this man ? This mark is only used in English for a direct question, and not at all where a question is implied. In such a place the ordinary comma, semicolon, colon and period are employed. A thin space or hair space precedes the interrogation, but sometimes a shoulder is cast before it. This mark does not seem to have been known to the early printers.

Interrogatories.—A class of legal work in England consisting of questions and answers. We have much of it in America in the shape of law reports.

Introduction.—A term applied to the preliminary portion of a work, to some extent explaining its purpose.

Invention of Printing.—Printing is generally regarded as having originated in Europe about the year 1450, but some forms of the art are of greater antiquity, and specimens have descended to us from the classical ages of Greece and Rome. It seems almost impossible that the invention could have been delayed much longer, as each part of the work had been separately executed, and all that remained to be done was to combine the different procedures, uniting with them some method of making the types cheaply. Cattle and slaves were branded in most ancient times; bricks and cylinders had stamps impressed upon them, some containing many words, and these cylinders were made in numbers, so that they could be sent to different places at the same time. They answered admirably for the purpose for which they were intended. The clay was inexpensive, the impression was not difficult, and the permanence of the whole was secured when desired by baking. Thus prepared, the cylinders could be preserved for many centuries. The Roman potters stamped their names in exactly the same way upon the wares they made. They used in some cases single letters, as a bookbinder now does. The Greeks engraved maps on plates of metal in the manner of copperplate engravers, although not reversed, and could have attained the later results if they had known how to fill the hollows with a black pigment and to lay sheets of parchment upon them, submitting the whole to pressure. No one seemed to think of the idea of impression and coloring together. Stencils were recommended by Quintilian as an aid for boys in learning how to write. Stamps were used for signatures, and this usage continued until the revival of learning after the Dark Ages. Procopius tells us that the Emperor Justinian employed a perforated golden plate to assist him in affixing his signature. Theodoric, king of the Ostrogoths, did the same thing. It also appears that "the Emperor Charlemagne and the kings who were his immediate successors formed the strokes of their monograms by following with the pen all of the openings cut into the plate or tablet laid upon the act to which they wished to subscribe. As they changed from time to time this cut-plate [or stencil], perhaps by design, it resulted that their signature was not always the same."

It will thus be seen that the ancients came very near to a discovery of the art, and experiments, indeed, may have been tried with something like a block-book. So learned a nation and so acute in all the practical affairs of life as the Roman must have had among it many citizens who would have seen the advantage of repeating the mark of a stamp upon many leaves, and that they did not do so must be ascribed to mechanical difficulties which had been overcome by the year 1450. Paper in our sense did not exist before about 800. Papyrus, composed of flat portions of reeds glued together to make a fair-sized page, was the predecessor of paper. It would probably have torn apart under the action of the press, was extremely uneven in thickness and very porous. The ink was without the qualities which we now regard as necessary. It was a thin wash, made of soot, thickened with gum, and occasionally reinforced with an acid to make it bite. Vellum and parchment, then also used, are greasy and hard to handle, and to-day, with all of the improvements in machinery and ink, both are regarded as undesirable substances to print upon. Neither was there any mechanical skill, as we now understand it, among the Romans. Architecture was almost the only art which required the co-operation of many persons in which they were successful. Simple labor-saving devices were never known upon the Italian peninsula. The farmer of Tuscany and the former Papal States still uses the plow which passed before the eyes of Virgil when he was writing his Georgics, and Horace Greeley recorded his surprise forty years ago at seeing a carpenter in the North of Italy make holes through a board with a red-hot iron instead of an auger. Cicero perceived that the letters of the alphabet by permutation might reach an infinity of combinations, but this knowledge led to no discoveries. What he said was to contradict the idea that the world had been created by chance. It reads:

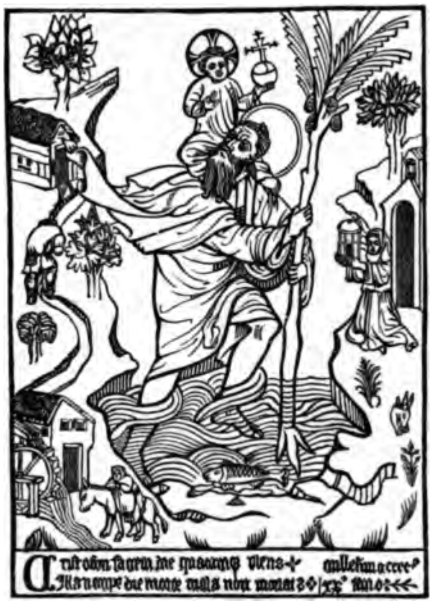
"Why could not the one who believes this possible also believe that if there were thrown upon the earth by thousands the twenty-one letters of the alphabet, formed in gold or any other substance, they would arrange themselves in the order which is found in the Annals of Ennius?"

Plutarch tells us about an action of Agesilaus, who wished to inspire his troops with courage. "Seeing his soldiers discouraged, Agesilaus wrote secretly in the hollow of his hand, but reversed, the word 'Victory;' then taking from the soothsayer the liver of the victim he laid his hand, thus written upon, against it, keeping it there the time necessary, meanwhile appearing plunged into unquiet meditations. Thus he remained until the marks of the letters had taken and were printed upon the liver. Then, showing it to those who were about to begin the battle, he said to them that by this inscription the gods foretold their victory."

Professor Karabaceti, a German, has recently been examining some old Egyptian records, and declares that movable types of wood, both for letter-press and ornaments, were in use in Egypt five hundred years before the time of Gutenberg. What confirmation he is able to give to this is not known.

The earliest invention of anything resembling modern printing was made in China about the year 1000, but xylographic printing had been in use long before. Blocks of wood were secured in clay or held fast by some other means, and were inked by means of a brush. Upon them the sheet was laid, and pressure was applied upon the back by another brush. This was a great step forward, but it produced no effect elsewhere, as China was secluded from the remainder of the world. It is doubtful whether the Chinese method was ever heard of in Europe by any person who felt tempted to multiply a manuscript by mechanical means. When the art began slowly to be developed in Italy, France, Germany and the Low Countries it was in connection with playing-cards and with initials used in books. The great capitals which began chapters and books could easily be made of their proper shapes by the impression of a single type held by the hand or driven in by a hammer upon the proper place. All of the ornaments which afterwards were needed could more certainly thus be painted where they should be, as painters divide off a canvas into squares before attempting to use the brush; but it is to playing-cards that we must chiefly look for the impulse which gave birth to printing. They have a universal language, and can be as readily understood by a Russian boor as by a Dutch merchant, an Italian ecclesiastic or a French prince of the blood. Unvarying in their patterns, calling for no nicety of execution and certain of sale, the bulk of the work in anything approaching to printing before the time of Gutenberg was in playing-cards. In their manufacture could be tested the press, the ink and the card-board. Image-leaves and block-books took up the work and extended it. Cards were known as far back as 1328, and in 1441 the makers of cards in Venice complained to the Senate that their trade in these articles and in printed figures had suffered much damage by the considerable number which were printed and painted outside of that city. Their use came from Turkey in Asia, which derived the play from Hindoostan. A similar game existed in China. In Europe the cards were both printed and stenciled.

The second advance on the road to typography was in the image-prints, which seem to have originated about 1420. Small pictures were engraved on wood and then printed, either by a press or by something like a proof-planer. The ink employed was thin and watery, inclining to a brown rather than to a black, and the texture of the paper was harsh. Many of these pictures were intended to be colored afterwards by hand, the lines of the engraving serving to give direction to the brush of the colorist. The tints were, however, most generally applied by a stencil-plate, which frequently slipped to one side. The earliest of these image-prints, or that which is regarded as being the earliest by the majority of bibliographers, is a St. Christopher. It has a date upon it of 1423. It represents St. Christopher as carrying the infant Jesus across a stream. After 1430 there are several others extant, and those are comparatively numerous which were executed between 1440 and 1450. All were found in religious houses, and the whole of them relate to religious subjects. Although these prints were all discovered in Germany or the Netherlands, or a little fringe of country just beyond their limits, many have no distinctive German marks; they might have been drawn or printed elsewhere. That the image-prints preceded type-printing is clear, and it is also certain that the practice acquired thus led to beneficial results for the art soon to be developed. The press almost certainly was put into use for working off the requisite number of copies. To understand this we must entirely dismiss the idea of a press as it exists at present. The ancient device was exactly the same as a cider press or press for any common or coarse use, except that the amount of iron employed in it was the very smallest that could be made effective. The screw was wooden, the nut was wooden, and the standards were so likewise. The lever to turn the screw was a long stick. What answers to the platen and the bed was of wood, although after a time the latter was made of stone. Only the necessary nails, small screws, the end of the great screw and the socket for it to turn in were of iron. On the lower ledge or bed, as it is called in America, the wooden block which was to be printed rested. It was probably inked by a cloth cushion stuffed with wool, and then the bearers were pushed up against the plate, the sheet of paper was laid upon it, and the screw was turned down far enough to give the impression. It is improbable that this could have been done at a more rapid rate than about three hundred a day, although on the modern hand-press two hundred and forty is considered the standard of an hour's work. With the imperfection of the apparatus and the ignorance of the workman of anything which could increase his speed, this would seem to be as high as possibly could be obtained. There are positive early statements that this was the rate attained. The proof-planer might have been employed, but a soft wood-cut would be very much injured by five hundred impressions thus taken, and it would have been destroyed in two thousand. The frotton, frequently said in the older books on the invention of the art to have been the method by which pressure was applied, could not thus have been used. The backs of the pages frequently bear evidences of a very hard impression, the paper being much indented on the printed side and raised upon the other. A soft cushion could not do this; neither could a soft cushion be rubbed over the back long enough to produce the polished appearance seen on the verso of these prints. The ink was thin and would not have held the paper in its proper place. At the present day the engraver has a thin paper on which to take proofs. He lays the sheet upon the block, covered with a very thick and glutinous ink, much stiffer than the ink employed on newspapers, and after making sure that the paper really touches the engraving he produces his impression by rubbing one part of the paper with an ivory burnisher, then proceeding to another part. The thin paper enables him to see how well he has reached his desired end, and if there is any place where he has not obtained the requisite blackness he applies the burnisher again. The friction against the top of the paper is very slight, but the friction from a cushion in such a place would be so great, provided it was pressed down hard enough to make a good impression, that the paper would slip from the part where it was first laid and destroy the entire work. This would be the case if the present ink should be used, but how much more so would it be the result when the common ink of 1420 or 1430 was employed, an ink which had very little more stickiness than the ordinary writing-fluid of to-day?



ST. CHRISTOPHER AND THE INFANT JESUS.

A second advantage which was developed by the printing of images and cards was the required improvement in the quality of the ink just spoken of. The first ink was carbon mixed with water and a little gum, but the medium was afterwards changed to oil. The carbon had to be used in large quantities so as to completely saturate the menstruum which held it, and undoubtedly there were many experiments before the proper substance, boiled linseed-oil, was discovered. A third acquisition from experience was the use of bearers or pieces of wood or metal as high as the block which was to be printed. The bearers had no ink upon them, but they prevented undue pressure at any one of the sides of the engraving. Of course this was done more or less imperfectly, but with the irregularity of construction of the old presses such a device was far more necessary than it is now.

From image-prints, with or without a line or two of text upon them, to block-books, or books of text alone, cut upon wooden blocks, the step was not great. The early block-books were small; the number of letters upon a page was few, and when one block was injured it was recut. Many of these opuscules have recently come to light; others have been known for hundreds of years. The use of this method of printing did not cease when typography was invented, for the blocks thus made had the same advantages which are now afforded by stereotyping. They could easily be put away; the edition could be large or small, as required, and the preparation of a set of blocks would consume less time than would be necessary for cutting punches and driving matrixes for a new type. Printers to this day in country offices cut lines with chisel and penknife, so that they may have them on hand when required, such as "auction," "vendue," "real estate," "slaughter." They are quickly cut on pine, and cost less than the wooden or metal types which otherwise must be purchased. It is not necessary to conceive that the inventors of typography should themselves have been familiar with block-printing in order to go still further. Ten minutes of observation of the work of one of the artisans employed in this occupation would show the theory, and the materials to work with had already to some extent been brought forward and used. Paper had been in existence for centuries, and the method of wetting it in order to soften and equalize the impression must have been known, as it was too harsh and unyielding to print otherwise. It was very thick, hard and uneven. The screw press, the bearers, the frisket to guard the sheet against being smutted, and the ink were all provided; what remained was to discover that letters could be separately and cheaply made and used over and over again. He who first attained this knowledge and then put it into actual, everyday practice was the inventor of printing.

Under the head of KOSTER the claims of the adherents of this inventor are stated, and the story of how his attention was drawn to the matter, what he did and how he was finally despoiled of the fruits of his ingenuity, is given. At first it is said that he cut words for the gratification of his children; then he made pages, and finally discovered how to cut apart the characters so that they could be recombined. Supposing that the block-books of Holland, including the Speculum Salutis, in which typography and xylography are combined, are his, as is declared in Haarlem, the discovery fell dead. No other person in Haarlem imitated him, as Gutenberg was imitated in Mentz. His books are few and small; they are not equal to those produced by the early German type-printers nor to those of the Italians. Knowledge of his claims died out completely, as he had no successor. The earliest book from Haarlem with a date is that of 1473. None earlier from any part of Holland is known. The question with a student of typography is whether the invention of printing was really made in Holland; whether the process was valuable and practicable, and whether it was preserved in Holland or transmitted by a more or less roundabout route to Germany. No doubt is entertained that letters and blocks were cut in Holland at an early day, whether by a legendary Koster or not is not material. The contention of his supporters is that separate letters were cut by him, first in wood and then in metal, and that finally the latter were cast—thus enabling the characters prepared for one book or one page to be employed on another book or another page.

At the present day the smallest letter made by a wood-letter manufactory is two-line pica, or a third of an inch. No doubt is entertained that it would be practicable for it to cut characters of the size of a fourth or fifth of an inch, or even of a sixth; but the modern wood-letter maker works with instruments of much precision. His pattern is a large letter of the kind which he desires to reproduce, and from which, by means of a pantograph, the image is reduced to a smaller size. Since the beginning of systematic cutting by Darius Wells in 1827 many improvements have been made and many tools have been devised for this special purpose. Smaller type than two-line pica are not made, because it is difficult to cut them, difficult to divide them, and hard to keep them in order in a printing-office. A little moisture or a slight accident would completely destroy their usefulness; but the legendary plan was to engrave on a block as many letters as could conveniently be put on it, the necessary space being left for the saw. When all was done they were cut apart and were in a condition to use for a book. Were this really the case we might reasonably expect to see in early books from Holland the irregularity of body which would characterize such letters, together with a constant variation of face or shape, as each character was repeated. This does not appear to have been the fact. The early Dutch work seems to be solid in body, though the characters are irregular. Take a hundred letters from one page and compare them with a hundred from another page, they do not appear to be repeated. They make a common error, but it is not identical. They have the characteristics of block-books, but not those of typography. Wooden type could not stand as close to each other as do the letters in the early Holland books. It has been suggested by Heber Wells, whose experience of forty years in the manufacture of wood-letter gives weight to his views, that the letters were cut upon long strips, for the preparation of which instruments of sufficient precision existed. The wood might have been prepared of the right height, cut into strips, fastened securely and letters engraved upon each. Then they could be used as metal types are used; but the warping from wetting and drying, the difficulty of keeping the characters upon a square body, and the fact that the writers who derive their views from Junius expressly say that the blocks were cut apart, preclude us from accepting the view that their letters were thus made. Some of the early books of Holland which are said to be done typographically answer very closely to block-books in overhanging, in adaptation to particular necessities, and in having each letter like others. If executed in wooden letters the characters would have been broken off in the overhanging part, the letters would have been more out of line than they appear in these ancient relics, and the constant labor of recutting must have been encountered.

The Koster theory, or that there was an actual Koster who did printing before 1450, has been given up everywhere except in Holland, although many bibliographers, learned in their art, maintain that there was an early development of the art in Holland, not imitated from Germany. The chief historic basis for this rests upon the statement of Ulric Zell. In 1499 the writer of the Cologne Chronicle declared that "Master Ulric Zell, of Hanau, now a printer in Cologne, through whom the art was brought to Cologne," had communicated as follows to him:

"Although the art [of printing], as has been said, was discovered at Mentz, in the manner as it is now generally used, yet the first prefiguration was found in Holland, in the Donatuses which were printed there before that time. From these Donatuses the beginning of the said art was taken, and it was invented in a manner much more ingenious than this, and became more and more ingenious."

Nothing here contained is incompatible with the invention of typography at Mentz, for there is no question that many steps had been taken in the manufacture of the things necessary for the art, and in rude printing in several places, if not many, before the master-stroke of casting letters in a mold was put into practice. The leaflets and little books which are now ascribed to Dutch sources before 1460 are very imperfect in workmanship, but it by no means follows that they were executed as early as that date. The number of the incunabula which have claims, according to Hessels, to rank in the list of those produced by unknown printers in Holland before a definite date appears is forty-seven. Four of them are editions of the Speculum, nineteen of some Donatus and seven of the Doctrinale. They are in five different types and are probably from five different Dutch presses. "Compared with the earliest dated books of 1473 and onward printed in Holland, they have nothing in common, while their brotherhood to the Dutch manuscripts and block-books of about thirty years earlier is apparent." Mr. Blades was unable to see how these could follow the finished productions of the press at Mentz, while by allowing them to be the earliest all difficulty could be avoided. This was simply because he viewed the impressions with the eye of a nineteenth-century typographer, brought up in England. In that country there is a remarkable uniformity in the quality of its work, and the changes which have happened there within the last fifty years have affected village and great city alike. It is doubtless the case that a press erected in a remote portion of Devonshire or Yorkshire would produce books very much the same as the ordinary office in London; but this would not be so where the compositor and pressman had picked up his knowledge, nor where he was not instructed by workmen of taste and experience. In the United States such lack of judgment and such inferior work have been common. Those who recollect the productions of Poughkeepsie prior to the war, tasteless, deformed and ridiculous, and compare them with the contemporary work of Buffalo can easily understand how beauty of work can characterize one place and be completely absent in another at the same time. The case of early Dutch printers bears comparison with that of the reverend gentleman in England who wrote a system of divinity and then spent the greater part of his life in printing it, assisted by his servant-girl. Yet he had good examples to look at. The early printers of Holland, if such there were, used old type and bad paper, and guessed at methods of procedure. They and many other fifteenth-century printers were like the amateurs of the present day, who, with a cheap press and a few pounds of type, but no typographical education, essay to turn out work beyond their capacity. Where and from whom were the printers to learn what practices to avoid and what to follow?

By card-making, image-printing and the manufacture of block-books Europe moved on to the discovery that by putting one letter after another a page of characters could be assembled and printed from, the letters afterwards being used on another page or in another book, and that these letters could be cheaply and perfectly made by casting in a mold. To write a Bible would require three or four years; but by printing the work could be done in half the time, five hundred or a thousand copies being ready at once. The phrase so often used in former days, that printing was "the art preservative of all arts," has become so well worn and so trite that we scarcely think of its truth; but the possession of one printing-press in Rome, as imperfect as that of Gutenberg, during the period from the rise of Julius Cæsar to a commanding position until the death of Augustus, with the labor of two men and devoted to producing what had been most worthy of note in the history of the city, would have given us a corpus of the history, the poetry, the drama, the biographies and the scientific writings of Rome such as we do not and never shall be able to possess. The marbles, the manuscripts, the coins, the architecture which still remain would be poor indeed in comparison. There could have been no question that out of the number printed then some would have escaped until 1460, either in themselves or by copies. The world's opinion, outside of Holland, is that this wonderful art began at Mentz. Disputes have arisen as to the relative shares of Gutenberg, Fust and Schoeffer in the invention, but practically none out of Holland as to the fact that this German city was the birthplace. Upon this Hessels, who denies the claim of Gutenberg to any higher rank than that of one of the first printers, says:

"When we now place together the clear documentary testimonies of the first fourteen years of printing (1454 to 1468) at Mentz, we see that they all come from Mentz itself. Everybody connected with the art speaks of it in the most public and unreserved manner; its importance is as fully realized and advertised during that period as it is at the present day; the German nation is even congratulated on possessing it; there is never any secrecy about it; once (about 1456) it is even called a new art."

The three persons who were concerned in the development of this art were John Gutenberg, John Fust and Peter Schoeffer. The former is generally believed to be the inventor. As the traditional account of printing has it, Gutenberg was the discoverer of the theory, and first made movable type with cut metal faces; Fust was the generous patron who supplied the money and who had a practical acquaintance with the methods of working on metal; and Schoeffer was the ingenious calligrapher who brought the art to its perfection by inventing the method of casting the types. There is little truth in this. Gutenberg appears by the suit at law to have been the inventive workman, toiling for the perfection of his new art; Fust was the money-lender, who insisted upon the return of the money he had lent, with usurious interest, and Schoeffer was the young student and calligrapher who succeeded in supplanting the inventor and carrying forward the business. In a summary way it may be said that John Gutenberg, who was born about the end of the fourteenth century, and who had lived for a part of his life in Strasbourg, returned to Mentz in or before October, 1448. In November, 1455, he was sued by Fust for the recovery of sixteen hundred guilders and interest, which had been spent on wages, rent, vellum, paper and ink. The goldsmith gained the action and seized for his satisfaction the office containing the material. Several pieces had already been printed at Mentz, presumably by Gutenberg, and one as far back as 1451. On August 15, 1456, a Bible was printed at Mentz, and in August, 1457, Fust was in partnership with Schoeffer, a relation which continued until the death of the former. Another Bible was printed at about this time, but no date is attached to it. There are thus three great books to be printed before the last date, besides numerous fragments, by these three men, one of whom, Fust, never took any part in the mechanical processes. The Psalter was the last of the three, for it is highly improbable that after once using colophons Fust and Schoeffer should have abandoned them. We know, besides, when the forty-two-line Bible was completed. A book as great as the Psalter could not well have been executed by any early printer with two or three workmen in less time than a year, nor could the Bibles have been completed under two years each. Allowing a year for casting types, cutting additional punches and making matrixes, and conceding that the original punches and matrixes had been made, we have six years during which labor must have been carried on in that city for making ready the first books. It might very easily have required two or three years more, but it must have taken at least this space of time. They were all undoubtedly the work of the same office, executed by persons who had acquired much experience. They bear favorable comparison in most respects with the work of the Elzevirs and the Stephenses, and it is evident that they are not the productions of tyros. Granted, therefore, that time was necessary; that Fust produced shortly after the dissolution of the partnership with Gutenberg a book so large and so fine that its punches could not have been made and its type cast and set in the brief year and a half next succeeding; that Gutenberg had been employed ever since August, 1450, in something which was undoubtedly printing, although from the terms of the agreement it is impossible to say that it might not have been block-printing; and that several other large works had been issued in Mentz between the date when Fust's agreement began with Gutenberg and the known date on the Psalter, it is impossible to resist the conclusion that this work must have been done by Gutenberg and by no one else, even putting to one side the confirmation from other sources. To imagine two offices in Mentz at the same time capable of planning and executing books like the two Bibles and the Psalter is to believe that two inventors were simultaneously at work on the same problems and that each alike attained success. Miracles were once wrought; but who would now believe that two Edisons could by accident be found in Orange, two men like Watt in Glasgow, two Franklins in Philadelphia, each employed on the same questions, and each alike successful?

A long contest has taken place upon the subject of whether the first metal types were cut or cast. Apart from the legendary account saying that they were cut, there are circumstances which lend plausibility to the idea. It is difficult to cast kerned or overhanging type, even now, but many of these letters are very close to each other and do overhang. If the reader will turn back to the facsimile of the Bible of thirty-six lines on page 41 he will see that in the second word, discipline, an overhanging long s is shown. The space between the c and the i is far less than any type-founder would now use, even in the cases requiring most condensation. The same may be said of the first and second letters in the third line, and indeed it is visible everywhere. Letters hang over as in the capitals in the last words of the first, third and sixth lines. The last letters of the eighth line are apparently a logotype, so close are they together. There can be no question that there were many logotypes used at the beginning, and that many letters were cut and recut. In Caxton's work, undoubtedly done with movable type, Blades has discovered in a single font many duplications. As the punches, made of copper or of type metal, wore out new ones were cut. It is to be noticed in the first place how closely the general effect is preserved. The types in the last line seem in their general effect to be the same as those on the first, although minute differences can be told by the magnifying-glass. The lining above and below, both in the small letters and in the ascending and descending ones, is very exact. There is much irregularity in the letters themselves, but they conform to a rule in this respect. The most important test, however, is the absolute identity of some of the letters with those in other places. There are about five hundred letters shown in this fragment. If the types were cut very few of them would be enough like others to deceive the eye into an impression of identity, for each character would look differently; but compare in this the counters or hollows in the centre of the letters, the general form of the characters, the repetition of the same irregularities, the breaking of the serifs, the weight of the strokes, and it will be found that there are few discrepancies which cannot be accounted for on the theory of wear or miscasts. Serifs of type cast on soft metal would break very quickly, and fine lines would cease to be continuous. Many defects in casting occur even in our day. The closeness of the letters can be accounted for by the file, which would soon allow one letter to touch against the next. The combined letters were very numerous. They included pp, ff, ss, st, ti, tu, re, cu, ct, si, de, co, ci, te, ce, or, ve, po, fa, he, be, as well as contractions for pro, um, em, en, the, uer, bus, bis, sed, am, tur, qui, quæ, quod, secundum and others.

One great difficulty in believing that these were cut types arises from the length of time which would be necessary to get enough characters to compose a page. At the present time a punch-cutter will require a day for each good Roman letter, and two or three letters a day are all that he can do on fancy fonts, when the shape is regular, but which does not require too great conformity to an established model. If, therefore, a page had two thousand letters, as many of the earliest pages had, it would have taken a letter-cutter four hundred days to make enough for that one page, cutting five each day. The great expense of this can readily be seen, but, as M. Bernard says: "How can we suppose that intelligent men like the first printers would not at once find out that they could easily cast the face and body of their types together?" No proof has ever been shown that bodies such as are now made by type-founders for special purposes, entirely blank and suitable for being engraved upon, were then employed. Such proof as we have is that the types were then made as they always have been since. Two or more forms of a single letter were employed together; letters were filed away so that more characters could occasionally be placed in a line, which were always thin spaced, and defective, miscast and battered type were used wherever possible. These are the causes of all of the mysteries of irregularity in early characters.

The mold of the early printer was the mold now used in hand-casting—not perhaps so well made, but embodying the same ideas. At the same time it may have been that some of the larger characters were cast in the sand, as poster type was in the last century. For such characters they may have used wooden punches, but copper was sharper and more durable. The matrixes of ordinary type were probably of lead; some drives of this material were used a hundred years ago in European foundries. Almost every metal was employed in combination with lead to form type metal, and about three hundred years ago the valuable qualities of antimony in this respect were discovered.

The unfortunate division between Gutenberg on the one hand and Fust and Schoeffer on the other resulted in the establishment of two printing-offices, of which the latter was the larger and better appointed. The almost entire loss of Gutenberg could not be repaired at once, and the cutting of a new set of punches would take a very large part of the year. Under the head of each of the principal actors in this matter at Mentz are traced the successive steps taken in the development and spreading abroad of this art. Before the capture of the town by Adolphus the number of copies of their productions which had been distributed were sufficient to perpetuate the art. Intelligent men could have seen and grasped the idea of repetition of letters upon a page, even if all those who had practiced as workmen and their tools had been swept away by a deluge or an earthquake. Printing had already begun at Bamberg and Strasbourg.

According to Hessels the productions of the press at Mentz began with 1454, the Indulgences being the first. Then followed several Donatuses, an almanac, a calendar, a broadside, a leaf and the two Bibles, one of forty-two and the other of thirty-six lines. Four types were used, together with an initial V, two large initials M and an initial U. These types were afterwards used by Schoeffer, Pfister and Bechtermunz.

There were not wanting those who denied the claims of both Mentz and Haarlem to the discovery. The first books have no printers' names upon them and no dates or places, and it has consequently become easy to assert the pretensions of others. The Book of Four Stories was printed by Albert Pfister at Bamberg in 1462, and it has since been proved that the types of this work were identical with those of the Bible of thirty-six lines. Many rashly jumped to the conclusion that Pfister must, therefore, have been the printer of both. He subsequently printed other works, all on the same face of type. His earliest book shows that his type was old and well worn; the appearance of his work is mean, and his wood-cuts are far inferior to those used in the books generally ascribed to the trio at Mentz. One of his books is in German, where new letters, like w, were required. These were sharp and well defined, while the other letters were very much worn. Pamphilo Castaldi is given credit for being one of the inventors. It is said that the use of initial letters of glass had been practiced in Italy for a century before 1457, the scribes finding them of advantage. Castaldi, when he discovered this, at once saw that it would be possible to print entire books, instead of occasional letters, with movable letters. He gave the idea to Fust, who, returning to his partners in 1456 or a little before, enabled them to appropriate the idea. In 1457 they produced the Psalter, the first book printed with movable characters of wood. This is the story as we have it. The details show great inaccuracies, apart from the question of main importance. Even granting that the narrative is true, of which there is no proof, it does not appear that Castaldi ever printed anything. The point to which he advanced was known to the Greeks and the Romans.

John Mentel of Strasbourg is another alleged discoverer. He died in 1478, and upon his tombstone is an inscription declaring that he was the inventor. The stone was apparently erected long after his death. The date which his principal supporters give for the discovery is 1440. His son-in-law, Peter Schoiffer, and Martin Flach at once made use of the art; but a servant of Mentel, called John Gensfleisch, after stealing the secret, fled to Mentz, where he soon established himself, through the aid of Gutenberg, a very rich man. The types were of wood, and pierced through the sides by wire. This story appears to have been fabricated. In the records of the city of Strasbourg Mentel appears for the first time in 1457, then being a Goltschriber or gold-writer; in another record of the same year his name is found in a list of artists and painters. A Roman printer in 1474 declared that Mentel had a printing-office in Strasbourg in 1458, in which he printed three hundred sheets a day, after the manner of Fust and Gutenberg. This gives him an early rank as a printer, but concedes him no standing as an inventor. Other persons who are claimed to have invented the art are Gresmund, Hahn, Jensen, Regiomontanus, Pannartz, Sweinheym and Vaelbaeske. The towns in which these persons and the others mentioned are said to have exercised their art were Augsburg, Avignon, Basle, Bologna, Dordrecht, Feltre, Florence, Haarlem, Lübeck, Mentz, Nuremberg, Rome, Russemburg, Strasbourg, Schelestadt and Venice.

The art, planted in Mentz, was not long in extending elsewhere. Mentz lies at about the centre of Germany at the west. Travelers were constantly passing from it to the Netherlands, France, Italy and Switzerland. Before the dispersion of the printers by the quarrel between the archbishops in 1462 the art had advanced to Strasbourg and Bamberg. The exodus gave one well-known printer to Cologne. Ten years after it had been introduced into four other cities; another ten years increased this number by twenty-two. The Netherlands had five towns to which printing had been introduced by 1484, Spain and Portugal twelve by 1486. England began in 1477. France and Italy, with Germany, were the countries where the new invention was most used, and where the greatest improvements were made. In 1458 the King of France sent Nicholas Jensen to Mentz to acquire a knowledge of the art. He was nominated by the chiefs of the mint. The knowledge he thus gained was thorough, and on his return to Paris he attempted to get enough money to establish an office, but failed, and went to Italy. In Venice he became famous. Sweinheym and Pannartz preceded him, setting up a press at Subiaco in 1465. They removed to Rome two years later. John de Spira began at Venice in 1469, and in the next year printers started at Milan, Foligno, Trevi and Verona. The amount of printing done there soon surpassed that in Germany, while a very decided advance was made in quality. The types soon assumed the Roman form, and in 1471 Jensen printed books with this style, well cut and with a face agreeable to modern taste. His presswork was also excellent. Venice became the centre of printing and bookmaking. Over two hundred printers had practiced the art there before the year 1500, including among them Aldus Manutius. He is responsible for the introduction of Italics, and books in Greek, which appeared at Milan in 1476, were first printed in Italy.

In France the art was not so soon introduced. Three printers, Ulrich Gering, Michael Friburger and Martin Crantz, went to Paris from Germany in 1469, and other printers soon began. In Lyons the first office was in 1476, and in Angers in 1477. Many beautiful books were printed in France within the quarter of a century next following, and the erudition and accuracy of the Stephenses in classical work left an impression upon French typography which remains to the present day.

The early printed books differ widely from those now issued. The printer of to-day is a creature of precedent, as much so as a lawyer. Before a book is printed in a particular manner he desires to see some similarly printed work, so that he may be justified to his conscience and to the public. He dreads the unfavorable comments of his contemporaries and rivals. The early printer cared for none of these things. He wished to sell his book, and to do so conformed as closely as possible to the handwriting and customs of the best scribes in his neighborhood. Our Roman letter is a copy of the handwriting used at Rome and Venice in 1460; our Fraktur is a modernized copy of the German handwriting of the same age. The earliest books had no title, the printing beginning at the top of the first page. Sometimes this was the first page of an index or table of contents, and there might be a brief description of the book. As paper, vellum and parchment were alike costly, and the calligraphers had been trained to economize these materials, the printer imitated them. There were no leads as a rule, their use not having been discovered for several years after printing began. All matter was taken in. The spaces were thin; the relief given by lines of quadrats is hardly ever seen, almost all blanks being avoided by the use of abbreviations. In Froben's Latin Bible of 1514, executed long after printing had become a settled occupation, the first verses in Genesis read thus:

> In pricipio creavit de celu & terra. Terra aute erat inanis & vacua: & tenebre erat sup facie abyssi: & spus dni ferebat sup aqs.

In this brief extract no less than seventeen words are abbreviated. The whole chapter is one run-up paragraph. The comma is a small upright mark, and colons and periods comprise the only other indications of punctuation. The leaves are numbered and not the pages. In the earliest books a blank was left at the beginning of each chapter or subdivision, so that the illuminator might be enabled to paint in the appropriate letter with or without some other drawing or painting. Outline types were sometimes used by the calligrapher to secure the proper shape. Placed where the letter should be it was smartly forced down by a light hammer or mallet if there was no ink upon it; if there was, the pressure of the hand must suffice. Then the color could be applied afterwards in exactly the proper lines.

Although the title was omitted, yet frequently such words as "incipit liber" or "here begins" introduce the text. At the end of the book were generally to be found the title, name of author, printing place and date, frequently with some pious ejaculation. The concluding paragraph was known as a colophon or rubrum, as it was often written in red ink. Sometimes it was printed in red after the work was finished. This was not always the case, and frequently it was two or three words, as "finis," "explicit liber," "hic est finis," "here ends," or the like. The size of the paper is not uniform, even in the same volume, and it sometimes happens that the length and width of the pages are not alike, the page gauge and the measure having been altered while the work was in progress. Some early books have no catch-words and no pagination. Many letters have unusual forms. Wrong fonts were very common, and proof-reading in the modern sense was little cared for. Let the words be right and it did not matter about capitals, punctuation, a well-considered system of abbreviations or a broken or smashed letter. Printers' marks or ornamental devices occur in many of them. Borders were frequently used after the first few years. They were engraved on wood. Many early books had a few copies struck off on vellum. Books were mostly bound in wood, entirely or half covered with leather, hogskin or parchment. To attach the cover to the book itself strips of parchment were used. Many were designed to be secured by hasps, corner-pieces or chains to a table or wall.

The tools then used by printers were few in number. The press was the old cheese or wine press very little modified. The ink has been described. The paper was hard, rough and unyielding, made in hand-molds, of course, and very small in size. The largest was about 20 by 25 inches. It was generally gray in color. The type was without a nick, varying in different fonts from three-quarters of an inch to an inch and a quarter in height, and it had a beveled shoulder. To print upon it the paper required to be wet and a thick blanket was needed. Blades was of the opinion that a composing-rule was not known at the beginning. The stick must have had its origin in the earliest years, although Gutenberg may have placed the types in a form with his fingers. A stick is shown in the arms of the printers of Nuremberg, now used by the Typothetæ, and Moxon illustrates one in his Mechanick Exercises. It was at first made of wood, and so remained for many years. Chases must have been originated within the first years, as to put the types into a wooden rim was too troublesome. The lay of the case in French, Italian and English was undoubtedly alphabetical, with some exceptions, as remains of it can still be seen. The galley was the common wooden galley, but for a score of years or so this was not known. The compositor placed his copy upon the farther side of his case or upon part of his upper case, but this usage was not general, as we learn from some old authorities. Sometimes the copy was read aloud to the compositors, each in turn listening. Red ink was made and was occasionally used. Perhaps the greatest difference, however, between the printer of that day and this was that there was no subdivision of employments. One of the fifteenth century bought his paper, and called in a carpenter or joiner to assist him with his wooden work, but everything else he was obliged to do himself. He cast his own type and dressed it, made his ink, set up his pages, worked them off, bound the book and sold it. He might even have written the work, as Caxton did many of his. If his press needed to be repaired or rebuilt the printer must give the details to the joiner; if an engraving was to be made he must cut it. His establishment was small, rarely exceeding two or three men, and he was subject to interference by magistrates and men high in authority. To move sometimes became necessary. The press could be put upon the back of one mule, and another one, or two at the most, could carry all his types. If type metal was scarce and there was a superabundance of w's, while l's were short, the molds were taken down, the furnace started and enough of the one kind was melted up to supply the deficiency of the other. Migratory offices were common in the early history of the art. Editions were small. Two, three and four hundred copies were regarded as sufficient. It is very unlikely that any book, not a Bible, a prayer-book or a school-book, was printed in an edition as large as a thousand. If the collation ran short and some sheets were reprinted no great care was taken that these should be an exact fac-simile of the missing sheet. None of the very early works seemed to have attracted any attention from the public because of their beauty, not even the Psalter of Fust and Schoeffer, or the great Bible of Gutenberg. In the respects in which they now are admired they did not surpass the work of good copyists, but in other respects they were inferior to the work with which they were compared. The borders, initial letters and rubrication could not be so well done on a printed page as on a written one. The copyists undoubtedly looked upon printing as a mechanical art, inferior in its quality to that practiced by them, and having no preference except in its cheapness.

Those who have written upon this subject are very numerous. From the beginning of the seventeenth century down to the present time there has been a continual succession of works upon this topic, and a number were issued before that period. Until the present century, however, little attention had been paid to it by printers themselves. They had been content to take their opinions from book lovers and collectors, many of whom had no accurate knowledge of the art of printing and were unable to get out of the rut of old traditions and prejudices. Of late, however, the earliest remains of typography have been examined with scrupulous care both by printers and bibliographers; traditions have been sifted, books have been compared, translations of old Latin works have been revised, and manuscripts have been examined. Much had been imposed upon the world, and many accepted conclusions were shown to be false. The new arts of lithography and process engraving have been used to give to those who are distant from the original books an idea of their appearance, and each of the subsidiary questions has been taken up by those who are competent to express an opinion upon one topic, although not perhaps upon the main question. All of the early books which treat of the beginning of printing are in Latin. Among the older books which should be consulted are Schoepflin's Vindiciæ Typographicæ, Wolf's Monumenta Typographica, Meerman's Origines Typographicæ, Maittaire's Annales Typographici, and Hain's Repertorium Bibliographicum. The later school, which investigated everything, includes Bernard's De l'Origine et des Débuts de l'Imprimerie en Europe, De Vinne's Invention of Printing, Blades's Life of Caxton and Pentateuch of Printing, Skeen's Early Typography, Weigel's Anfänge der Buchdruckerkunst, Madden's Lettres d'un Bibliographe, Holtrop's Catalogus Librorum Sæculo XV° Impressorum and his Monuments Typographiques des Pays-Bas au Quinzième Siècle, Campbell's Annales de la Typographie Néerlandaise, Reed's History of the English Letter Foundries, Conway's Woodcutters of the Netherlands, Meurs's Keulsche Kroniek en de Costerlegende van Dr. Van der Linde, Hessels's Gutenberg: Was He the Inventor of Printing? Hessels's History of the Invention of Printing, Hessels's Haarlem the Birthplace of Printing, not Mentz, and Van der Linde's Haarlem Legend. In the Encyclopædia Britannica, under the head Typography, Hessels has summarized his knowledge upon this question.

There are three schools: those who hold with the Dutch that the art began in Holland; those who believe with the Germans that it began in Mentz, and a third school, of which Blades was a conspicuous exponent. The latter had settled down into the belief of a double creation. "The examination of many specimens," he says, "has led me to believe that two schools of typography existed together. The ruder consisted of those printers who practiced their art in Holland and the Low Countries, and who by degrees only adopted the better and more perfect methods of the school founded in Germany by the celebrated trio, Gutenberg, Fust and Schoeffer."

The further spread of typography is, according to Hessels, indicated by the following data: 1470 at Nuremberg (Johan Sensenschmidt, Friedr. Creusner, Anton Koberger, &c.), Berona or Beromünster in Switzerland (Helyas Helye, alias De Llouffen), Foligno (Æmilianus de Orfinis and Johannes Numeister), Trevi (Johann Reynard), Savigliano (Hans Glim), Paris (first printers the three partners Ulrich Gering, Michael Friburger, Martin Krantz); 1471 at Spires, Bologna, Ferrara, Florence, Milan, Naples, Pavia, Treviso; 1472 at Esslingen, Cremona, Mantua, Padua, Brescia, Parma, Monreale (Mondovi), Fivizzano, Verona, Iesi (?), St. Ursino (?); 1473 at Lauingen, Ulm (perhaps as early as 1469), Merseburg, Alost, Utrecht, Lyons, Messina, Buda; 1474 at Louvain, Genoa, Como, Savona, Turin, Vicenza, Valencia (?); 1475 at Lübeck, Breslau, Blauheuren, Burgdorf, Trent, Cracow (?), Modena, Reggio (in Calabria), Cagli, Caselle or Casale, Pieve (Piove) di Sacco, Perugia, Piacenza, Saragossa; 1476 at Rostock, Bruges, Brussels, Angers, Toulouse, Polliano (Pogliano); 1477 at Reichenstein, Deventer, Gouda, Delft, Westminster, Lucca, Ascoli, Palermo, Seville; 1478 at Oxford, St. Maartensdyk, Colle, Schussenried (in Würtemburg), Eichstädt, Geneva, Vienne, Trogen (?), Chablis, Cosenza, Prague, Barcelona; 1479 at Erfurt, Würzburg, Nimeguen, Zwolle, Poitiers, Toscolano, Pinerolo, Novi, Lerida, Segorbe; 1480 at London, St. Albans (or in 1479), Oudenarde, Hasselt, Reggio (in Modena), Salamanca, Toledo, Nonantola, Friuli (?), Caen; 1481 at Passau, Leipsic, Magdeburg, Treves, Urach, Casale di San Vaso, Saluzzo, Albi, Rouge-mont (?); 1482 at Reutlingen, Memmingen, Metz, Pisa, Aquila, Antwerp, Promentour, Zamora, Odense; 1483 at Leyden, Kuilenburg (Culenborg), Ghent, Chartres, Chalons-sur-Marne (?), Troyes, Gerona, Stockholm; 1484 at Bois-le-Duc, Siena, Udine, Soncino, Klasternenburg, Winterburg, Rennes, Loudéac; 1485 at Heidelberg, Ratisbon, Pescia, Vercelli, Tréguier or Lantreguet, Salins, Burgos, Palma, Xeres; 1486 at Münster, Stuttgart, Chiavasco, Voghera, Casal Maggiore, Abbeville, Brünn, Schleswig; 1487 at Ingoldstadt, Gaeta, Rouen, Murcia; 1488 at Stendal, Viterbo, Gradisca, Besançon, Constantinople; 1489 at Hagenau, San Cucufat (near Barcelona), Coria, Pamplona, Tolosa, Lisbon; 1490 at Orleans, Grenoble, Dôle; 1491 at Hamburg, Nozzano, Goupillières, Angoulême, Dijon, Lantenac; 1492 at Zinna, Valladolid, Leiria; 1493 at Lüneburg, Cagliari, Freiburg (in Breisgau), Urbino, Acqui; 1494 at Oppenheim, Monterey, Braga; 1495 at Freisingen, Freiberg, Scandiano, Forli, Limoges, Schoohoven (monastery Den Hem), Wadstena, Cettinje; 1496 at Offenburg, Provins, Granada; 1497 at Munich, Barco, Carmagnola, Avignon; 1498 at Tübingen, Perigueux, Schiedam, Tarragona; 1499 at Montserrat, Madrid; 1500 at Olmütz, Pforzheim, Sursée, Perpignan, Valenciennes, Jaen. Printing was introduced into Scotland in 1505 by the establishment of Andrew Millar at Edinburgh, and into Ireland at Dublin in 1551. As for non-European countries and towns, printing was established in Mexico in 1544, at Goa about 1550, at Tranquebar in 1569, at Terceira, in the Azores, 1583; Lima in 1585, Manila and Macao (China) in 1590, in Hayti in the beginning of the seventeenth century, at Puebla in 1612, Cambridge (Mass.) in 1638, Batavia in 1668, Philadelphia in 1685, New York in 1693, Tiflis in 1701, Germantown in 1735, Ceylon in 1737, Halifax (Nova Scotia) in 1766, Madras in 1772, Calcutta in 1778, Buenos Ayres in 1789, Bombay in 1792, in Egypt (at Alexandria, Cairo and Gizeh) in 1798, at Sydney in 1802, Cape Town in 1806, Montevideo in 1807, Sarepta in 1808, Valparaiso in 1810, Astrakhan in 1815, in Sumatra and at Hobart Town and Santiago (in Chili) in 1818, in Persia (at Teheran) in 1820, and at Chios about 1821.

Inventory.—An inventory of every printing-office should be taken either at the close of the year or on July 1, when business is the lightest. Allowance should be made for wear and tear and other depreciation, as laid down under DEPRECIATION OF MATERIAL.

Inverted Commas.—Commas turned upside down placed before quoted matter to show that it is extracted; they are followed at the end by an equal number of apostrophes, which close the quotation. In American custom two commas are used for the beginning of a quotation; the English use one comma. A quotation within a quotation here has one comma, but in England two. For further quotations inside of others the rule of two and one alternately seems to be the best. The following may be given as an example:

"I asked John to tell me what he saw and heard at the scene of the murder. 'Why,' said he, 'I found Henry there, and he had had a conversation with the man charged with the offense, whose name was William Hendrickson. He said: "As soon as I heard of the affair I harnessed my horse and drove over. Hendrickson, who was accused, was on the ground. I asked him: 'William, did you commit this horrible crime?' He turned and looked me full in the face and declared emphatically. 'I did not. I knew nothing about it, nor was I near here.' After some further conversation I left. I don't believe he did it." Henry seemed well acquainted with Hendrickson, and has much confidence in his innocence.' You will of course understand that I could not go over there myself, and I rely a great deal upon what John tells about Henry's belief in the matter."

Inverted commas are also used for emphasis, in this case nearly always two together. Ships are quoted in some books, as the "City of Paris," and so are horses, newspapers, parts in the drama, fictitious persons and nicknames. A noted newspaper of New York, in speaking about the "boys," that is, those politicians who do the greatest portion of the election work, always characterizes them as "Barney," "Mike," "Danny," "Steve," and so on. Properly speaking, nicknames should not be quoted. Dan Webster, Harry Clay, Abe Lincoln and Maggie Mitchell should be printed thus and not as "Dan" Webster, "Harry" Clay, "Abe" Lincoln and "Maggie" Mitchell. Some printing-offices use instead of inverted commas characters like reversed apostrophes. Turned commas take a thin space after them, and another thin space is used before the apostrophes. The latter part of this rule is not observed in many offices.

Invictus Machine.—A small treadle platen machine used for jobbing purposes in England.

Involucrum.—The cover to a cylinder of wood, bone or gold, around which in antiquity the scroll of papyrus or parchment was rolled.

Iowa.—Printing began in the State of Iowa on May 11, 1836. On that day John King published the Dubuque Visitor. The next year the Iowa News was begun in the same place by Russell & Coriell. The next towns were Montrose and Burlington in 1837, and Fort Madison and Davenport in 1830. The first steam-press was used in the office of the Davenport Gazette in 1855, and the first daily began there in 1854. In 1840 there were 4 newspapers; in 1850, 29; 1860, 130; 1870, 233; 1880, 569, and 1890, 807, of which 45 are daily and 658 weekly. The principal towns in a printing sense are Burlington, Cedar Rapids, Davenport, Des Moines, Dubuque and Iowa City. Upon the press which printed the Dubuque Visitor, the first journal, it is said were afterwards printed in succession the first newspapers in Western Wisconsin, Minnesota and Dakota. It was burned by a band of marauding Sioux in 1862, then being at Sioux City Falls.

Ir en Alcance (Sp.).—A notification to the compositor that his copy runs on to the following take.

Irish.—Printing in the Irish language, otherwise known as Erse, a Celtic tongue, is as old as 1571, when a catechism was printed in it at Dublin. Colonel Vallancey, in his Irish Grammar, gives three different alphabets of the Irish language; the first consists of twenty-five letters, the second of twenty-six, and the last of sixteen. In the first the order of the letters was b, l, f, s, n, h, d, t, c, q, m, g, ng, z, r, a, o, u, e, i, eu, oi, ui, io and ao; in the modern one, a, b, c, d, e, f, g, i, l, m, n, o, p, r, s, t, u and h.

Characters.		Power.		Names.	Pronunciation.
A	a	A	a	Ailm	aw
B	b	B	b	Beit	beh
C	c	C	c	Coll	k
Ꝺ	ꝺ	D	d	Duir	deh
E	e	E	e	Eada	a
Ꝼ	ꝼ	F	f	Fearn	f
Ᵹ	ᵹ	G	g	Gort	g
I	ı	I	i	Ioga	e
L	l	L	l	Luir	l
M	m	M	m	Muin	m
N	n	N	n	Nuin	n
O	o	O	o	Oir	o
P	p	P	p	Peit	p
R	ꞃ	R	r	Ruis	r
S	ꞅ	S	s	Suil	sh
Ꞇ	ꞇ	T	t	Teine	teh
U	u	U	u	Ur	oo
H	h	H	h	Uat	h

IRISH ALPHABET.

In addition to the last list the ancients used qq, zz, ng, ea, io, oi, y and ao. It is stated by Irish historians that the language was reduced to writing before the introduction of letters by the Romans into Britain. The present order is that of the Romans.

There are some contractions, cast as one letter. Many of the letters are silent, and consequently the pronunciation varies considerably from the spelling. It is supposed that there are about a million of people in Ireland who can speak no other language than this, and that another half million speak it, at the same time knowing English. Several British type-founders make Irish characters.

Iron.—One of the most common metals, possessing great tenacity, hardness and rigidity. No other metal is so useful. It differs from nearly all other metals in its capacity of acquiring and retaining magnetism and by its property of welding. Its specific gravity is 7.78. It is used in printing as cast and wrought iron, and as crucible steel. Bessemer steel has been very little employed. Iron types or stereotypes are sometimes used for printing on boxes. The mold having been made in sand, the metal is cast, afterwards being dressed up somewhat on the face and planed on the back.

Iron Shooter.—Special sticks made for locking up formes where the quoins are small.—*Jacobi.* This expression is unfamiliar to Americans, the equivalent here being an iron shooting-stick.

Irregular Bodies.—In a strict sense those bodies which are between two known and recognized sizes of type, as minionette between minion and nonpareil; but in the older and historical sense those type which have not long been in use, or which originated long after the invention of printing, are thus distinguished. In this way paragon, small pica, bourgeois, minion and some other sizes were called irregular during the last century. Up to the present time the sizes which are neither nonpareil, brevier, long primer nor pica or their multiples are occasionally so denominated. Stower says that they were seldom introduced by the printer, from the apprehension that his office might be thrown into confusion in consequence of the slight difference which exists between those fonts and others in point of size. There ought, however, to be no confusion in an office, even between minion and brevier, which are the nearest together. If possible, however, different nicks should be used for those which are nearly alike in size.

Italian.—This language is spoken through the whole of Italy, and as a lingua franca throughout half of the Mediterranean. It bears a closer resemblance to Latin, from which it is derived, than Spanish, and much closer than French. There are three theories of its origin. One is that it is as old as the Latin and existed concurrently with it during the reign of the twelve Cæsars and before, from the foundation of the city of Rome. It was simply the language of the common people, while Latin was the language of literature. Much corroboration is given to this view by a number of obscure words known to exist in antiquity, but rarely found in good classical authors, while cognate forms are found in the speech of to-day. For instance, cavallus, French cheval, Italian cavallo, in classical Latin equus; bellus (French belle), in classical Latin pulcher. It is argued that the language of Sallust was too highly involved for common people ever to learn it. A second view is that the common Latin and classical Latin were altered by time, and together concurred in making the Italian of to-day, new words of course coming in. A third view is that the present Italian is simply a corruption of the ancient tongue, modified by the ignorant and careless. It is certain that some rustic Latin was talked as early as the seventh century, and by the year 800 or 900 it had become perfectly distinct from Latin in words and grammar. The earliest complete specimen is of the year 1195.

It assumed a literary form earlier than any other Romance tongue, and earlier than any Germanic one. Dante began writing in it in the thirteenth century, and shortly after Petrarch and Boccaccio enriched it. From that time on it has not lacked able writers. It exerted a powerful influence on the other languages of Europe, and poets sought in it examples of style in versification and the proper use of words. Ariosto, Tasso, Machiavelli and Bembo were authors later than those previously mentioned. The language has much richness in diminutives and augmentatives, and has a greater variety in the definite pronoun than any other tongue of modern Europe. The adjective follows the noun, which is uninflected in the genitive or dative. A singular kind of words is used for rounding out sentences and phrases, meaning nothing by themselves. The construction in syntax is very bold and free. There are many dialects, each differing widely from each other, and all differing from book Italian. Almost all educated persons use one of these in speaking to those around them, and the literary language when conversing with strangers. The Lord's Prayer in Italian and Latin is here given, the Latin being transposed to follow the same order as the Italian:

Padre nostro che sei ne' cieli, sia sanctificato il tuo
Pater noster qui es in cœlis, sanctificetur tuum^{2}
nome. Il tuo regno venga. La tua volontà sia fatta
nomen^{1}. tuum^{3} regnum^{2} Adveneat^{1} tua^{3} voluntas^{2} Fiat^{1}
in terra come in cielo. Dacci oggi il nostro pane
(et)^{7} in terra^{8} sicut^{4} in^{5} cœlum^{6} da^{4} (nobis) hodie^{5} nostrum^{2} Panem^{1}
quotidiano. E rimettici i nostridebiti come noi
quotidianum^{3}. Et dimitte (nobis) nostra debita sicut (et) nos
ancora li rimettiamo à nostri debitori. E non in-
(dimittimus) nostris^{2} debitoribus^{1} Et ne (nos) in-
durci in tentazione, ma liberaci dal maligno.
ducas in tentationem, sed libera (nos) a malo.

Italian, Printing In.—The Italian language has twenty-five letters, w not existing in real Italian words. Circumflexes and grave and acute accents are necessary for all the vowels, although some of them do not belong to Italian. The grave accent is the only one which really belongs to the language. Other characters are like those in French. Punctuation follows nearly the same rules as in French. There is a thin space before a comma, and a space or an en quadrat after a period. The upper case is not as large as the lower case, being only five-eighths as high. They are given on the next page.

In a font of 100,000 letters the characters run in the following proportion in lower case:

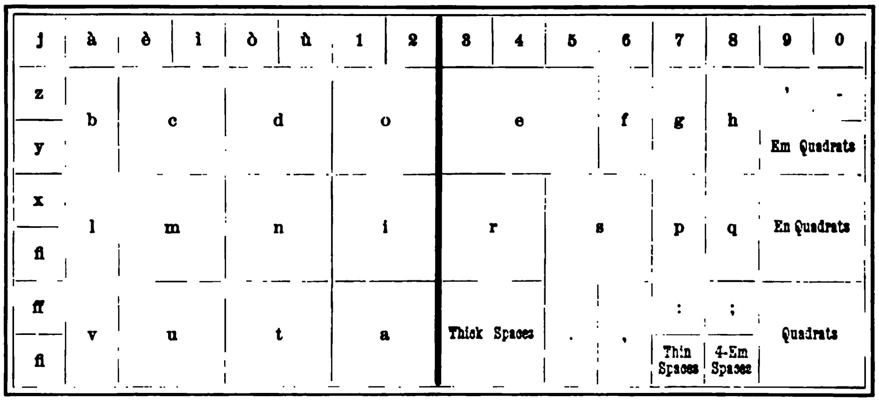
i, 7,000; e, 6,500; a, 6,000; o, 5,500; l, n, r, s and t, 4,000 each; c and d, 3,000 each; u, 2,500; m, the comma and the period, 2,000 each; p, 1,500; f and g, 1,250 each; v, 1,200; b, hyphen and apostrophe, 1,000 each; h, 750; z and j, 500 each; x, 300; y, 200; k and w, 100 each. There are eight superior letters, $^{a\ e\ i\ o\ m\ r\ s\ t}$.

The sizes of type, the dimensions in Didot and American points, and the American names of equivalent sizes are given on page 304. Only the English letters exactly correspond to American types; in all other languages they vary considerably.

There are other names among the Italians for these sizes. The titles above given are those from Pozzoli's Manuale di Tipografia. Reed, in his History of British Letter Foundries, calls them Parmigianina (pearl), nomperiglia (nonpareil), mignona (minion), testino (brevier), garamoncino (bourgeois), garamone (long primer), filosofia (small pica), lettura (pica), silvio (English), soprasilvio (Columbian), testo (great primer), parangone (paragon), ascendonica (double small pica), canoncino (double pica), sopracanoncino (double English), canone (double great primer), corale (four-line small pica), reale (French canon). The height to paper differs in different foundries. In some it is 63 points, and in others 66. Quadrats and spaces are about twelve points less.

Æ	Œ	W	Ç	È	É	Ê	Ë	á	é	í	ó	ú	w	Ŷ •	℞ §
R	S	T	U	V	X	Y	Z	â	ê	î	ô	û	ç	æ	œ
I	J K	L	M	N	O	P	Q	ä	ë	ï	ö	ü	k	—	—
A	B	C	D	E	F	G	H	!	?	a ✠	e +	o ffi	r ffl	»	( )

ITALIAN UPPER CASE.



ITALIAN LOWER CASE.

Typography is not as far advanced in Italy as in France and England. There are, it is true, offices which do as good work as can be demanded, but the usual standard is lower. The cut of the face of type strongly resembles that of the French. The composing-stick is very shallow, holding only from one to four lines. The matter, after composition, is immediately emptied upon a short galley, and as that approaches fullness the type is tied up and taken off. When it is to be finally made up these packages are again brought forth and divided into pages. In title-pages heavy faces are more used than in English, fancy type is not proscribed, and lower case is also largely employed.

Names.	Size in Points.	Old Name.	Sizes in American Points.	American Equivalent.
Tre	3	Diamante	3¼	Half Minionette.
Quattro	4	Milanina	4¼	Diamond.
Cinque	5	Parigini	5⅜	Agate.
Sei	6	Nomperiglia	6⅜	Minionette.
Sette	7	Mignona	7½	Minion (large).
Otto	8	Testino	8½	Brevier (large).
Nove	9	Garamoncino	9⅝	Bourgeois (large).
Dieci	10	Garamone	10¾	Small Pica.
Undici	11	Filosofia	11¾	Pica (small).
Dodici	12	Lettura	12⅞	Doulbe Minionette.
Quattordici	14	Silvio	15	Columbian.
Sedici	16	Testo	17⅛	Great Primer.
Diciotto	18	Parangone	19¼	Paragon.
Venti	20	Grosso Parangone	21⅜	Double Small Pica.
Ventiquattro	24	Palestina	25½	Double Pica.
Ventotto	28	Canoncino	30	Five-line Nonpareil.
Trentasei	36	Trismegisto	38½	Double Paragon.
Quaranta	40	Canone	42⅞	Four-line Small Pica.
Quarantaquattro	44		47	Four-line Pica.
Quarantotto	48	Doppio Canone	51½	Five-line Long Primer.
Cinquantasei	56		59⅜	Five-line Pica.
Settantedue	72	Triplo Canone	77	Seven-line Small Pica.
Ottantasei	86	Grossa Nomperiglia	92	Nine-line Long Primer.

ITALIAN SIZES OF TYPE.

The printer's vocabulary in Italy is rich. A false frontispiece is the bastard title; the devil's box is the place for broken letters; papa is the term for dead horse; tempestuous copy is that which is filled with Italics, figures, small capitals, &c.; a sentinel is a letter which, falling from the form, remains upright on its foot; a fish is an out. There are other peculiar expressions.

Italiano (Ital.).—The name in Italy for the character we call Italic. It is there called also corsivo.

Italic.—Type with an inclination to the right, differing from the Roman both in this respect and in some other little details. It was invented by Aldus Manutius, the first of this family who carried on printing, and is said to be an imitation of Petrarch's handwriting made by Francisco da Bologna, an able engraver. Aldus obtained several privileges for the exclusive use of Italic type from the Senate of Venice, as well as from the pontiffs Alexander VI., Fabius II. and Leo X. The fashion for it spread very rapidly. Aldus himself set many entire books in it, and used large quantities in his other works. Every other printer who used Roman characters copied the design as nearly as possible, somewhere about two-fifths of the font being in this letter, which was styled by the Germans Cursiv. The character was originally called Aldine or Venetian. One author says that another object in making this letter was to prevent the excessive number of contractions then current. Aldus first produced this face in 1501 in a Virgil, and afterwards brought out five other sizes. The Italic was only in the lower case, the caps remaining upright. It was in use in France in 1521, and in Switzerland before that. England adopted it in 1524. After a time it was used chiefly for quotations and for prefaces and like parts of a book, but it was originally intended for the whole text. At the present day its employment is chiefly to mark emphasis. The proportion of two-fifths once used had sunk in 1700 to one-fifth; a century later it was a tenth, and now is still less. It could be almost entirely dispensed with, thus making the pages of a book present a much better appearance. The most difficult people to control in relation to it are scientific men, librarians and bibliographers.

The use of Italic at the present day is entirely dependent upon whim. All persons are agreed that it shall be used for emphasis; but how that shall be determined is questionable. There is no Italic in the Bible, except where it marks words supplied to make the sense more perfect, yet no one ever doubted that it was easy enough to tell where the emphasis should fall. It must be used infrequently, or otherwise the value of having a special character is lost, and a page becomes like a school-girl's letter, marked with meaningless emphasis. A very common use of Italic is to denote names of newspapers and magazines. Some go further and mark books. Ships are very often italicized, and there used to be a habit of italicizing proper names, but this has nearly died out. As a rule words in foreign languages are in Italic, but not sentences. From this rule law Latin and law French must be excepted. They go in Roman. Such words as feme covert and tort may be taken as examples. Printers should also note that these French words are sometimes spelled differently in literary French. Side-heads are frequently in Italic.

Accents come with Italic the same as with Roman. So do small capitals, although this is a recent innovation. Occasional examples have been known for two hundred years, but not until lately have many fonts been furnished with them. The cases are laid exactly like the Roman, but care should be taken that the quadrat box and the unused boxes do not become receptacles of pi. In a very handsome Bible published by Bensley at the end of the last century Italics were not used; but to indicate the insertion of words for which an equivalent did not exist in the original a dot was made under the vowel of the word thus interpolated. In manuscript Italic is denoted by one stroke under the line.

Italic Cases.—Cases for holding Italic fonts, as distinguished from those containing Roman letters. When the font is not too large one case only is employed, usually with the capitals at the right and the lower case at the left, each of the boxes being somewhat compressed.

Itálica (Sp.).—Italic. Also called Cursiva and Bastardilla.

Italicised.—Words or sentences in Italic—indicated in manuscript by a single line underneath the words which should be emphasized.

Italy.—A country at the south of Europe, forming a long peninsula. The art of printing was taken up in Italy earlier than in any other country except that of its birthplace, Germany, and there it was most successful. Those who introduced the art were Sweinheym and Pannartz, two German printers, at Subiaco, in the year 1465. Two years after they went to Rome, where they did much work, but not prospering. In Venice the first printer was John de Spira, so called from the city in which he was born. When he died in 1470 he was succeeded by his brother Vindelin. Nicholas Jenson, another printer, began at Venice in 1471, and soon showed greater skill than his contemporaries or predecessors. In Milan Anthony Zarot, long regarded as the inventor of signatures, began in 1470. Three other towns took up the art in the same year—Foligno, by John Nummeister; Trevi, by John Reynard; and Verona, by John of Verona. The other cities which in the first years after its introduction began to print books were Bologna, Ferrara, Naples and Pavia in 1471; Fivizzano, Padua, Mantua, Mondovi, Jesi and Cremona in 1472; Parma, Brescia, Messina and Vicenza in 1473; Como, Turin and Genoa in 1474; Modena in 1475; Trent in 1476; Palermo, Ascoli and Lucca in 1477, and Casal in 1481. Cotton, in his Typographical Gazetteer, enumerates thirty-seven other places in which printing was executed before the year 1500. In some of these cities an immense deal of work was done. Rome had thirty-seven master printers before the end of the fifteenth century, and Venice two hundred and one. Florence had twenty-two.

The work thus executed was much of it excellent. Jenson had been trained at the mint in France, and his type lined better, was more regular in form and more beautiful in design than any which had been cast elsewhere. To him is due the credit of cutting the first Roman type which gave general satisfaction. Sweinheym and Pannartz had made a ruder Roman several years before, but it had many Gothic mannerisms. The office of Jenson descended to Andrea d'Asola, and it was there that Aldus Manutius showed his skill. Venice was long regarded as the centre of ideas and of good workmanship in printing, and thither other printers resorted to find models for imitation. In 1501 Aldus invented the Italic character. Sweinheym used Greek characters in a book brought out at Subiaco in 1465, but the first book wholly printed in Greek was the Grammar of Lascaris, by Paravasinus, in Milan in 1476. Milan also printed the first Greek classic and the first portion of the Greek Scriptures. Florence printed a Homer in 1488 upon a beautiful great primer face. Greek printing, however, reached its greatest success at the press of Aldus Manutius, who for a generation turned out one book after another in this language. He had nine separate fonts. In this country, too, Hebrew works were first issued largely. The Bible was printed in handsome form in that tongue at Soncino in 1488, and Bamberg, who established his Hebrew press at Venice in 1517, raised the fame of that already famous city by his types and workmanship.

The first book printed in Arabic was executed in Italy, and there also the Koran was first issued. The reputation acquired in the first half century after printing was introduced was not lost subsequently. The successors of the first Aldus did work worthy of him. The Catholic college known as that de Propaganda Fide began operations in 1622, and in 1627 began printing. Since that time New Testaments, missals, psalters, prayer-books, breviaries and memorial books have been printed by it in nearly every language which has been reduced to writing. During the next century appeared Giambattista Bodoni, a very famous printer of Parma, whose works equaled in beauty any produced up to that time in the world. He delighted in large type and great pages.

During the last few years the progress made in Italy has not been great. The works produced there in science or history, apart from local history, are few, and its light literature has for a century largely depended upon that of France, which has colored the original works of Italians while giving them much which is easy to translate from. In no department is there great activity. Thus the aggregate amount of printing done there is less than that of any other of the principal nations of Europe. The latest statistics of that country show thirteen hundred printing-offices, with eight hundred power-presses and twenty-five thousand workmen. Neither in press manufacture, type-founding nor paper manufacture is Italy now in the front rank. The chief centres of printing at present are Florence, Rome, Milan, Genoa, Naples and Venice.

Newspapers are published in large numbers in Italy. There is a strict law of censorship, which applies to all offices alike. The largest circulation is about sixty thousand. Feuilletons must be published, but they are mostly obtained from the French, as Italian novels are rare. In 1881 there were 148 daily, 450 weekly and 88 publications less frequent than dailies and more frequent than weeklies; 208 periodicals less frequent than weeklies and more frequent than monthlies; 256 monthlies and 24 other periodicals. Together they issued 269,426,360 copies in a year, or 862,065 copies a day, counting the year to consist of 313 days. This was at that time only a little more than one-tenth of the number issued in the United States, although the population was rather more than half that of this country. An Italian newspaper was begun in New York in 1854. In 1880 the number had increased to four. Three of these were published in California and one in New York. There are now four in San Francisco, three in Chicago, one in New Orleans, four in New York, two in Boston, and one in Philadelphia. From the great number of immigrants coming hither, it seems likely that the number will soon be much increased.

Its Own Body.—This term is applied to the text type of a work to distinguish it from the note or appendix types, usually smaller, or the introductory or preface type, usually larger.

Its Own Paper.—The particular kind of paper used for a certain work. Ordinary proofs are usually taken on one kind of paper, the same for handsome works or the commonest jobs, but a publisher frequently desires to see how a page or four or eight pages will look upon the paper which it is intended to use. The margin will also be made up properly, and the general appearance of the sheet can be much better ascertained. When a proof is thus pulled it is said to be on its own paper.

Irisdruck (Ger.).—Lithography in assorted colors, printed in such a manner that each color merges into the next, like the colors in the rainbow.

Ives Process.—A photo-engraving process of great beauty, appearing in large and small black dots, separated by white lines, in appearance nearly like the Meisenbach process, yet differently manipulated.

J

J THE tenth letter of the English alphabet, is one of those characters least used in the lower case. Probably the letter e is employed fifty times to one j. It is a thin letter, nearly always thinner than a thick space, and is kerned at the foot. For this reason it is preceded by a thin space at the beginning of lines in stereotype work, as otherwise the projection might be cut off. In the capital form it bears a great resemblance to I, from which it was divided. This is particularly apparent in some old fonts. The capital J is transposed out of its regular order in the upper case and comes at the end of the alphabet, with the U, making the twenty-fifth and twenty-sixth letters, according to their position. I and J were once deemed the same letter, and dictionaries and lexicons used them in supposed alphabetical order, as, for example, "Jamb" and "Iambic." In France the use of the j for the consonant and i for the vowel was not established until the middle of the seventeenth century. Jacques Pelletier, of Mans, is said to have first placed the j at the beginning of words which began with this consonant in his French Grammar (1550). Gille Beys, printer in Paris, imitated him in 1584. The confusion in English encyclopædias and dictionaries lasted until within sixty years. When it was introduced there was very little uniformity in its use. Coryat, in his Crudities, published in 1611, says: "J observed a custome in all those Italian cities and townes through the which j passed, that is not used in any other country that I saw in my travels, neither do j thinke that any other nation of Christendome doth use it, but only Italy. The Italians, and also most strangers that are commorant in Italy, do alwaies at their meales use a little forke when they cut their meate."

In many books in Latin used by the Roman Church j is not employed, words which in other printing would require j being in them spelled with i. Many Latin scholars of the present day print the classics in the same manner, saying that as the ancients knew nothing of any division of this letter it is fitting that the works of early times should be printed as Cicero and Cæsar would have deemed proper. The pronunciation of j varies more widely than that of any other letter. In English it is dzh, in French zh, in German y, and in Spanish h. It is a very frequent initial of proper names. It is rarely used for signatures, K following I.

Jacket.—A movable border around a letter or initial. —*Jacobi.*

Jackson, Joseph, a celebrated punch-cutter and type-founder in England, died on January 14, 1792, in his fifty-ninth year. He is celebrated as the cutter of several Oriental faces, as well as the character used in the reproduction of the Domesday Book. His two-line English, used in Macklin's Bible, is of the greatest symmetry.

James, Thomas, a type-founder in the early part of the last century in England, whose letters from Holland, whither he went to buy punches and matrixes, throw a great deal of light upon type-founding at that time. He furnished Ged, the British inventor of stereotyping, to whom he appeared to have acted dishonourably, with type which was worn instead of new, as it should have been, and intrigued with the king's printers so that Ged should not be successful. He died in 1736.

Jansen, Reynier, the second printer in Philadelphia, was originally a lace-maker at Alkmaer, in Holland. He probably came to Pennsylvania in 1698. Soon after he bought twenty acres of land in the vicinity of Philadelphia. In 1699 he purchased ninety-nine acres in Germantown, being described in the deed as a merchant of Philadelphia. On October 20, 1701, he sold the same plot of ground, being then described as a printer. A volume was issued with his imprint, entitled God's Protecting Providence, in 1699, and it is believed that he began printing late in that year. From the winter of 1692–3, when Bradford removed to New York, until this time there had been no press in Philadelphia. His work shows an untrained typographer, with a meagre font of letter. He died in the early spring of 1706.

Janszoon, Laurens or **Louwerijs,** a Hollander to whom some writers have attributed the invention of printing. He was confounded with Lourens Janszoon Koster, to whom the credit properly belongs, if to any one in Holland.

Japanese.—The language spoken by the inhabitants of Japan, a group of islands off the eastern coast of Asia, rather larger than the British Islands. The speech is classed by itself. There are two kinds of characters employed by the natives. One is a very elaborate system of word-signs somewhat like the Chinese. This has been shortened into syllabic characters, there being four different systems. They are printed in the same manner as the Chinese, being engraved, the ink laid upon the blocks by a brush, and pressure given to the paper by another brush. Roman characters are also used, and the native representations of words are also cut separately on wood. They are arranged systematically in a huge case about thirty feet long. Several men can work on this case at once. There are many thousand different characters.

The language of Japan is spoken by about forty millions of people, and from their love of literature and intense national pride it is easy to see that there is a great future before it. It does not bear any resemblance to European languages.

The first printing executed with metal types for the Japanese was by the Jesuits in the seventeenth century. Roman characters were employed. A grammar and dictionary were printed in 1632 at the office of the Propaganda at Rome. In Yeddo, now called Tokio, the capital of Japan, printing has been more or less done since 1785. A type-foundry and various other printing requisites were ordered by the Japanese government in 1874 from Germany, but the impulse which caused this order dated back to the time when Commodore Perry visited Japan, some forty years ago. The Japanese have taken hold of Western learning with great avidity, and thoroughly instructed teachers and professors of every branch of science are now to be found in Japan, most of them being foreigners. Colleges have been founded on the model of those in Germany and this country, and many books have been printed.

According to a recent census there are now in Japan 551 printing-offices and 3,538 booksellers. Of these 128 printing-offices and 591 bookselling-shops are at Tokio, the capital. Next to it comes the district of Osaka, with 65 printing-offices and 356 booksellers. Of newspapers, Tokio possesses 24, with a total circulation of about 2,500,000 copies. The first political journal appeared at Yeddo in 1833, containing extracts from English and Dutch newspapers in the Indies. Up to that time the only kind of newspaper which had appeared was a Japanese print called the Shimbun, which gave rough drawings, with text to match, of crimes and accidents. The first daily newspaper was on June 18, 1871. Tokio has two monthly reviews and there are half a dozen illustrated journals.

Japanese Paper.—Very thin paper of a silky texture made in Japan and used for artists' proofs.

Japanese Vellum Paper.—A thick, hand-made paper, having a vellum surface, and manufactured in Japan.

Jefe de Tanda (Sp.).—The man who has charge of making up piecework.

Jeffing.—A game of chance with em quadrats, the nicked side of the quadrat standing for one and the other sides blank. If one quadrat mounts upon another it is a false throw, and must be repeated. Playing with type is a very old custom. Moxon records that in his day printers thus had games of chance, and that employers discouraged them, because they battered the type. See CUSTOMS, ANCIENT.

EDWARD O. JENKINS.

Jenkins, Edward O., a printer of New York, was born in Ohio in 1817, of Welsh parentage. He was apprenticed to the printer's trade in New York, and after finishing his time was noted as being a compositor of unusual expedition and accuracy. In 1844 he began business for himself, working chiefly for publishers, and in the end built up a large trade. He was an active member of the original Typothetæ, serving on many of the most important committees. He died on April 20, 1884, his business being continued by his sons.

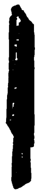
Jenson, Nicholas, an early and very important printer, was a native of France, and in early life was employed in the mint at Tours as an engraver. In 1458 the king ordered the chiefs of the mint to nominate some persons of proper experience to go to Mentz in order to get definite information about type-printing, and Jenson was sent. He acquired the art, but at Cologne, it was thought by Dr. Madden. While there the king died, and his successor, who had imbibed a dislike to his father's favorites, did not favor his plans for establishing printing in Paris. It is believed that he was with the Brethren of the Life in Common at Weidenbach for some time. He finally fixed himself in Venice, where he began printing and type-founding in 1471. His works were admirable, and he continued the printing business in that city until his death in 1482. As a type-founder he excelled all contemporaries and predecessors.

Jerry.—The noise made by beating chases, scraping sticks and other ways when an apprentice finishes his time. This is recorded by Jacobi, but the word does not seem to have been used in America, although the custom once existed here. Very few of these ancient customs have ever been much followed in America. They have seemed foolish to American workmen, and without good reason for their existence.

Jet.—The projection at the end of a type after being cast. It is broken off, and a groove made in the foot of the type in its place.

Jewel Press.—An amateur job press, printing a sheet 7 by 11, with disk distribution and working by foot-power.

Jewett, John L., a proof-reader and author of New York city, was born in Portsmouth, N. H., on October 28, 1809. He first entered a printing-office in his native town, and later went to Boston. He removed to New York about 1832, and after that was uninterruptedly employed as a proof-reader and in translating for the publishers. He was a reader at different times for the Appletons, the Harpers and the Methodist Book Concern. His last engagement was with Poole & McLoughlin. His rank as a critical reader was the very highest, and he was entrusted with the revision of the most difficult works both in English and in foreign languages. He was one of the founders of the American Swedenborg Publishing Society, and edited its church organ, the New Jerusalem Messenger, from its beginning in 1855 till 1862. He had a high rank as an expounder of Swedenborg's doctrines. He wrote a French Ollendorf, Jewett's Spiers's French and English Dictionary, De Fivas's French Reader, and many translations from the French, German and Spanish. He was long a member of the Typographical Society and once its president. At the meeting on January 17, 1849, he pronounced an oration on Benjamin Franklin, afterwards published in pamphlet form, which was a chaste and finished production. His health was always delicate, and his life ended on June 11, 1878.



TYPE WITH ADHERING JET.

Jigger.—A small box with divisions to hold peculiar sorts, usually made of quadrats and leads.—*Jacobi.*

Job.—According to Savage and preceding authors, any work which makes less than a sheet. Since then, however, the class of work done under this name has much enlarged, and it may now be taken to be any work not a newspaper, large pamphlet or a book. In another sense it is an order for a printing-house. Thus, to reprint Littré's Dictionary would be a good job for the printer.

Job Case.—A lower case condensed into two-thirds of its usual width, half of the boxes in the upper case being placed by its side. The whole is then of the ordinary size of a lower case.

Job Chases.—The chases used for jobbing purposes. Small ones are generally of cast iron, but larger chases are made of wrought iron. They are of various shapes, those for small presses being of the styles furnished by the makers, but those for hand and cylinder presses may be of any dimensions. For headings they are broad and shallow, and for theatre programmes long and narrow. It is not usual to bevel them on the inside, although this has been advocated. Those used for posters, although as large as for newspapers or books, have no crossbars.

Job Compositor.—One who follows the composition of jobs. Long practice is requisite to give expertness, as there are very many varieties and sizes of type in every office, and to assemble these characters properly, bringing out the thought of the writer, and violating no typographical rules, is very difficult. Job compositors usually receive more wages than book compositors, varying in most of the principal cities of the United States from eighteen to twenty dollars a week, but frequently exceeding the latter figure.

Job Font.—A small font of type used for display, distinct from a book font. Usually speaking there are no small capitals, and if there are Italics to match these constitute another font. Unnecessary sorts are omitted. The size of the font is indicated in the specimen-books by a statement of the number of capital and lower-case a's there may be, as 70A 200a, or 6A 10a. All other letters are in proportion. A job font must necessarily have an excess of the little used letters, for words are liable to occur together which require a number of the characters least in general demand. The proportion of ordinary letters in a book or newspaper font are: z, 1; x, q and j, 2 each; k, 4; v, 6; b, p and g, 8 each; w and y, 10 each; f, 12; c and m, 15 each; u, 17; l, 20; d, 22; r, 31; h, 32; i, n, o, s, 40 each; a, 42; t, 45; e, 60.

Even in these figures there is a surplus of the smaller letters on which cases very rarely run, this generally happening with those most used. Thus the true proportion of z to e is probably about one to one hundred and fifty. In the smallest job fonts, however, this character is provided in the ratio of one to five. There are letters less called for than z. It is probable that ffl is not used once where z is wanted twenty times, yet it is also provided in small job fonts in the proportion of one to five. To the Roman book scheme mentioned there would be six each of the more frequently employed figures, and five of those less used, while the capitals would vary from one to three each. Above is the ratio of sorts in job fonts put up by the American Type-Founders' Association.

SCHEME FOR JOB FONTS.

Capitals.														
A	3	4	5	6	8	10	12	15	18	20	25	30	40	50
B	2	2	2	3	3	4	5	6	8	8	10	12	16	20
C	2	3	4	4	5	7	8	10	12	13	17	20	27	33
D	2	2	3	4	5	6	7	8	10	11	13	16	21	27
E	4	5	6	8	10	12	14	18	22	24	30	36	48	60
F	2	2	3	3	4	5	6	7	9	9	12	14	19	23
G	2	2	3	3	4	5		7	9	9	12	14	19	23
H	2	2	3	4	5	6		8	10	11	13	16	21	27
I	3	4	5	6	8	10	12	15	18	20	25	30	40	50
J	2	2	2	2	3	4	4	5	6	6	7	8	10	12
K	2	2	2	2	3	4	4	5	6	6	7	8	10	12
L	2	3	4	4	5	7	8	10	12	13	17	20	27	33
M	2	2	3	4	5	6	7	8	10	11	13	16	21	27
N	3	4	5	6	8	10	12	15	18	20	25	30	40	50
O	3	4	5	6	8	10	12	15	18	20	25	30	40	50
P	2	2	3	4	5	6	7	8	10	1	13	16	21	27
Q	1	1	1	2	2	3	3	3	4	4	5	6	7	8
R	3	4	5	6	8	10	12	15	18	20	25	30	40	50
S	3	4	5	6	8	10	12	15	18	20	25	30	40	50
T	3	4	5	6	8	10	12	15	18	20	25	30	40	50
U	2	2	3	4	5	6	7	8	10	11	13	16	21	27
V	2	2	2	2	3	4	4	5	6	6	7	8	10	12
W	2	2	2	3	3	4		6	8	8	10	12		20
X	1	1		2	2	3	3	3	4	4	5	6	7	8
Y	2	2	2	3	3	4	5	6	8	8	10	12		20
Z	1	1	1	2	2	3	3	3	4	4	5	6	7	8
&	1	1		2	2	3	3	3	4	4	5	6		8
Æ	1	1		1		1	2	2	2	2	3	3		4
Œ	1	1	1	1	1	1	2	2	2	2	3	3		4
$	2	2	2	2	3	3	4	4	6	6	8	8	10	12
£	1	1					1	1	2	2	2	2	3	3
1	3	3	3	3	4	4	5	5	8	8	10	10	12	15
2	2	2	2	2	3	3	4	4	6	6	8	8	10	12
3	2	2	2	2	3	3	4	4	6	6	8	8	10	12
4	2	2	2	2		3	4	4	6	6	8	8	10	12
5	2	2	2	2	3	3	4	4	6	6	8	8	10	12
6	2	2	2	2	3	3	4	4	6	6	8	8	10	12
7	2	2	2	2	3	3	4	4	6	6	8	8	10	12
8	3	4	4	4	5	5	6		10	10	12	12	15	18
9	2	2	2	2	3	3	4	4	6	6	8	8	10	12
0	3	4	4	4	5	5	6	6	10	10	12	12	15	18
.	3	4	5	6	8	10	12	15	18	20	25	30	40	50
,	3	4	5	6		10	12	15	18	20	25	30	40	50
-	2	2	2	2		4	4		6	6	7	8	10	
'	2	2	3	3	4	5	6	7	9	9	12	14	19	23
:	1	1	1	2	2	3	3	3	4	4		6	7	8
;	1	1	1	2	2	3	3	3	4	4	5	6	7	8
!	2	2	2	2	3	4	4		6	6		8	10	12
?	1	1	1	2	2	3	3	3	4	4		6	7	

Lower Case.														
a	5	6	8	10	12	15	20	25	30	40	50	60	75	100
b	2	3	3	4	5	6	8	10	12	16	20	24	30	40
c	3	4	5	6	7	8	11	13	16	21	27	32	40	53
d	3	4	5	7	8	9	12	15	18	24	30	36	45	60
e	6	8	10	13	16	20	27	33	40	53	67	80	100	133
f	2	3	3	4	5	6	8	10	12	16	20	24	30	40
g	2	3	3	4	5	6	8	10	12	16	20	24	30	40
h	4	4	5	7	8	10	13	17	20	27	33	40	50	67
i	5	6	8	10	12	15	20	25	30	40	50	60	75	100
j	2	2	3	4	4	5	6	7	8	10	12	13	15	20
k	2	2	3	4	4	5	6	7	8	10	12	13	15	20
l	4	4	5	7	8	10	13	17	20	27	33	40	50	67
m	3	4	5	6	7	8	11	13	16	21	27	32	40	53
n	5	6	8	10	12	15	20	25	30	40	50	60	75	100
o	5	6	8	10	12	15	20	25	30	40	50	60	75	100
p	2	3	3	4	5	6	8	10	12	16	20	24	30	40
q	1	2	2	3	3	4	4	5	6	7	8	9	11	16
r	5	6	8	10	12	15	20	25	30	40	50	60	75	100
s	5	6	8	10	12	15	20	25	30	40	50	60	75	100
t	5	6	8	10	12	15	20	25	30	40	50	60	75	100
u	3	4	5	6	7	8	11	13	16	21	27	32	40	53
v	2	2	3	4	4	5	6	7	8	10	12	13	15	20
w	2	3	3	4	5	6	8	10	12	16	20	24	30	40
x	1	2	2	3	3	4	4	5	6	7	8	9	11	16
y	2	3	3	4	5	6	8	10	12	16	20	24	30	40
z	1	2	2	3	3	4	4	5	6	7	8	9	11	16
æ	1	1	1	1	2	2	2	3	3	3	4	4	5	7
œ	1	1	1	1	2	2	2	3	3	3	4	4	5	7
ff	1	1	2	2	3	3	3	4	4	5	6	7	9	12
fi	1	1	2	2	3	3	3	4	4	5	6	7	9	12
fl	1	1	1	1	2	2	2	3	3	3	4	4	5	7
ffi	1	1	1	1	2	2	2	3	3	3	4	4	5	7
ffl	1	1	1	1	2	2	2	3	3	3	4	4	5	7

OTHER SORTS ACCORDING TO ORDER.

Job Galley.—A galley used to facilitate the work of a job compositor. It is broader and shorter than that used by book-men, and is usually of brass. Sometimes slice-galleys are meant.

Job House.—A term applied in England to printing-offices where the chief kind of work done is in jobs.

Job Office.—A printing-house where the chief work is in jobs.

Job Press.—A press on which job-work is done. It is, however, in practice usually limited to the treadle-machines, which do not print a sheet larger than 14 or 15 by 21.

Job Printing.—Taken in a wide sense this comprises nearly all of the work done in most book and job offices, for the proportion of books which are of a literary nature is small. Nearly everything printed is calculated to serve a private interest, and is thrown away after temporary use. Following printers' custom, job-work is that branch which admits of display type and does not take more than a sheet or two of paper. It comprises all small work. Some kinds attract the eye at once, as posters and handbills; others are sent by mail in envelopes, as circulars and invitations; others are handed around, as cards; but the great mass are under no rule. A list is here given of the most common kinds:

Account-book headings, ball tickets, bank notices, bonds and coupons, billheads, bills of lading, bills of fare, blank-books, business cards, certificates of deposit, certificates of stock, checks, commutation tickets, deposit tickets, drafts and notes, printed envelopes, election tickets, festival tickets, freight billheads, freight tickets, fare tariffs, handbills, hotel registers, indexes, inland bills of lading, insurance notices, labels, law blanks, leaflets, letter-circulars, letter headings, manifests, memorandum billheads, money receipts, monthly statements, newspapers, note circulars, note headings, order-books, orders of dancing, pamphlets, pamphlet covers, passage tickets, programmes, price currents, policies, posters, railroad blanks, restaurant tickets, shipping cards, shipping receipts, show-cards, time-tables, transfers of stock, working-lists, wedding cards and wrappers.

The job-room should be arranged so that the utmost facility can be given to the workman. The cabinets and frames should be in good repair, an abundance of chases, reglets, quadrats, leaders, brass rule, and sidesticks and quoins provided; the stones left free, so that there can be no lost time in imposing a form, and light and ventilation should be good. Everything ought to be in perfect order, and no carelessness or inattention should be permitted anywhere. The workmen should receive good wages, and should be picked men. In this department slow and inaccurate hands ought not to be tolerated. Very much depends upon the foreman in this department as to the quantity and quality of the work. There are good men who have thoroughly learned the trade, and yet to whom nature has not given the faculty of taste. To a certain extent this can be cultivated, but the finest work comes from those who are naturally gifted with the ability to execute it. There are some men who themselves can do good work, but have no ability in planning work for others, and who are unable to secure a good day's work from those under them.

A job office requires system, even more so than a book office, for the work is small, and each order is as different from other orders as the skill of man can make it, and each avails itself of all of the varieties of type, border and rule which exist, but which the other branches of the trade are forbidden to use. It therefore calls for great skill to lay out the work, to provide the material, to see that harmony is preserved, and that due dispatch is obtained. In selecting materials great care should be taken that the faces are thoroughly good, unnecessary sizes omitted, the proper quantity obtained, and the type laid as it should be. Adams in his Typographia gives twenty sizes of type, but a good job foreman will know how to dispense with many of these, particularly since so many founders have been casting on the point system. It may be said generally that in medium-sized and small offices nonpareil, brevier, long primer, pica, three-line nonpareil, double pica, five-line nonpareil, and three and four line pica are enough. In larger offices, dividing the distance from pica to great primer into two, by putting in English, and between great primer and double pica, by putting in paragon or double small pica, is preferable; but if all of the common sizes are used, there are only twelve below four-line pica. Each of these sizes requires a condensed, an extra-condensed, an ordinary thickness, an extended and an extra-extended face, the last being less necessary than the others. These styles must be heavy, light and medium weight. There are several faces which are absolutely necessary in their complete series, such as Gothic, antique, Clarendon and light-face expanded. Others are nearly as important, while some are undesirable except in small or in large sizes, such as full face or bold face, as it is variously entitled. This shows best in small type. Grecian can only be obtained in large type, and very heavy antique is now only in use in posters and other out-door work. For the bodies of posters, where formerly a very heavy Roman was used, a better style is now employed—an Ionic or a Clarendon light-face condensed. It is the custom of good job printers to buy nearly everything they can in series, and in light work all of the display in one job is frequently in larger and smaller sizes of the same face. The largest size of metal type is now twelve-line pica, but wood type can be obtained as large as is desirable. Twenty-four or thirty line pica is large enough for the principal line in a single-sheet poster, sixty lines will do for a two or three sheet poster, and a hundred lines for any office which does not make a specialty of this kind of work. A variety of scripts is essential in a large office, but in a small office one or two kinds, with some of the new and fashionable Italics, are sufficient. Old style must be provided throughout, and if the office is small and cannot get both old style and plain Roman it had better dispense with the latter. In the smallest job office there must at least be a full case each of nonpareil, brevier, long primer and pica, with a double quantity of capitals and of small capitals, if the latter can be afforded. The arrangement of the office of James K. Bettis, formerly of Little Rock, Ark., shows how type may be selected. He divided them into kinds, according to width, but he might also have done so according to weight of face. His classes are as follows:

Extra-Condensed Body—
- Very light face.
- Light face.
- Medium face.
- Heavy face.
- Very heavy face.
- Ornamental face.

Condensed Body—
- Very light face.
- Light face.
- Medium face.
- Heavy face.
- Extra heavy face.
- Ornamental face.

Medium Body—
- Very light face.
- Light face.
- Medium face.
- Heavy face.
- Extra heavy face.
- Ornamental face.

Extended Body—
- Very light face.
- Light face.
- Medium face.
- Heavy face.
- Ornamental face.

Texts—
- Light face.
- Heavy face.
- Condensed face.
- Extended face.

Scripts—
- Light invitation.
- Commercial—18 to 60 points.
- Circular.

Miscellaneous—
- Circular Italic.
- Art Gothic.
- Typewriter, &c.

Wood Type—
- Extra-condensed face.
- Condensed faces.
- Medium faces.
- Extended faces.

The method adopted in the De Vinne Press is like that of Mr. Bettis in theory, but differs in detail. In a paper read before the United Typothetæ upon a specimen-book of the material contained in one place Mr. De Vinne said:

"Begin by getting like kinds of type together in separate racks or cabinets. Antiques, Gothics, blacks and ornamentals should be in groups, whether there are or are not enough to fill a rack. But do not get them too compact. Make reasonable allowance for the future addition of new styles.

"This done, label every rack or cabinet with a descriptive letter (or large figure) which can be easily seen and read. Then number every case with a distinctive figure. Also paste on each case the type-founder's name of the type. All these labeled names should be in one style; double small pica antique lower case is large enough.

"Write down the name of every font of type exactly as it is printed by the type-founder. Add the initial letters of the founders, as M. L. & Co., F. L. & Co., D. F., &c. Allow a good space for adding the measurement of each style.

"Make up a stick to a measure of about fifty picas. Set up as the first line a full row of pica em quadrats. Then take each size and style of type in regular order, and set up of that size and style its full alphabet of twenty-six letters, A to Z. Write down the exact length of the alphabet in pica ems and fractions, which can easily be counted by means of the line of pica em quadrats below. The alphabets of capital letters and the lower case (and the small capitals if there are any) should each be separately composed and measured, and the exact measurement written down. Very large types, the alphabets of which exceed fifty ems, can be measured on a galley by a yard stick, allowing six picas to the inch, which is accurate enough for large measurements.

"When this has been done begin the specimen-book. A cap quarto is a convenient size, for which a measure of about thirty pica ems will be wide enough. In the measure selected set up one full line of every kind of type, using any words that may be desired. When all the types are set, then classify them. Group together all Roman capitals, all small capitals, all lower case, antiques, blacks, Gothics, &c. Then classify as to widths, keeping separate extendeds and condenseds. Keep series together as much as possible, so that they can be made up on one page, or on two or more following pages, that the entire stock of any style can be readily examined.

"Now go back to your written record, and put in type the names as given by the founders, with your measurement of the width of each size and style.

"To the descriptive head-lines might be added such information as would be needed by a strange compositor, such as 'For stereo. only,' or 'Not to be used on cards,' or 'For coarse work only,' or 'A small font,' &c. If there is an excess or a deficiency of figures this information should be printed. If there are special or peculiar accents these accents should be shown in the specimen. Any information which will prevent useless composition is of value and should be put in. The pages may then be made up in the usual way, allowing spaces on each page for future additions to be pasted on. Impose two pages to a form of cap, to print sheet-wise, on right-hand pages only. Print carefully on strong paper."

By using this plan or one similar to it the repeated composition of lines is prevented. A compositor can very quickly tell after setting up a line once whether another line will be more suitable for length. The label on the case should be varnished.

The weight of type to be bought must of course be determined by the amount of money which is to be spent. No general display can be made with thirty or forty fonts of type, but with sixty or seventy most work can be executed acceptably. A hundred fonts, however, are a small number for an office which means to do fashionable work. Three or four hundred would be necessary for an establishment which attempts to compete with the best of its rivals. The last entirely new office for a large job printer in New York city inventoried 620 fonts. Some of these fonts were very small. An imprint Gothic with 30A and 70a would be unnecessarily large, while there are some types, such as Monastic, of which a very few words would be needed. A seed catalogue, with a thousand side-titles in Clarendon or Gothic, will require a full case of the letter selected. It is better to purchase in double, triple and quadruple fonts. Very much more can be done with a quadruple font than with four distinct ones. There are special words which draw very heavily upon sorts. If extra type are bought the next job will run upon some other sorts. Such a word as Mississippi would use up most small fonts of type above great primer in twice setting. Cabinets are the most desirable receptacles in which to keep small fonts of small type, but larger type are best put into full-sized lower cases. Where the latter can be made dust-proof by the use of special frames or cabinets it should be done. Wood type and very large metal type are usually kept in specially contrived cases or upon long strips of wood on inclined stands.

Wood Type is spoken of under that heading. These should be plain in face, and not less than 5A in size. A 3A font is useless in many cases. The condensed letters are more valuable than the uncondensed, yet a few of the latter must also belong to every assortment. In conjunction with wood type is wood rule. In towns where an engraver can be found it is frequently worth while to have some lines engraved, as they come into use in almost every poster. Bordering of posters is not now so frequently done as at one time. Where the paper to be printed upon is of fine surface metal letters are preferable to wood.

The usual price of the smaller fonts is about three dollars, a double font therefore being six dollars and a quadruple twelve dollars. Such figures do not include spaces and quadrats, and it is generally inexpedient to keep such sorts in ordinary job cases. Where there is a large font it may be expected that there will be times when a compositor will be engaged for half an hour or an hour at work upon it. In this case, spaces and quadrats should be provided to accompany the font, but it is usually better to have one case of each of the principal sizes upon a stand to which a line can be taken to be spaced out. If spaces are in all cases it will frequently happen that they will be pied, and the various kinds will almost certainly be mixed. Two fonts of differing type should never be laid in the same boxes, as the time lost in separating more than counterbalances anything made by the economy in cases.

All type should be selected by the manager or proprietor. The tone of work of an office is insensibly fixed by the supervision of its owner, so that work from his place will look unlike that from another office, which could not be the case if foreman after foreman selected the styles. A type once having been bought additions can be made to it to any extent necessary. Whenever sorts are deficient they should be bought. Cuts should be filed away and indexed in a book. Old type should be discarded before the very last bit of wear has been taken out of it. When it ceases to do good work it is time to sell it.

In an office doing all classes of work the size most used for fancy faces is pica. Long primer and great primer are much needed. In offices below the first magnitude diamond is unnecessary, and a few pounds of pearl Roman are sufficient. If no time-tables or price currents are printed agate can be dispensed with. Minion is not necessary, nor is bourgeois. Small pica and pica are both required. Great primer Roman is the largest face of that style which it is necessary to provide, and one or two cases will be sufficient. English, the next size smaller, might be useful. For poster-work full cases of large and heavy-faced type are necessary. Where the work runs on illustrated catalogues, sometimes of great size, six or eight cases of long primer or brevier will sometimes be required if the job is to be produced with dispatch. In such cases the make-up will be the slowest part, as many cuts must be run in. A job hand who is in a hurry on a particular order will frequently find it advantageous to allow the secondary matter to be set by another man.

All jobs should be distributed as soon as worked, unless ordered otherwise. The compositor should not be permitted to pick letters, nor when copperfaced and plain-faced type are in the same office should they be mixed to the smallest extent. All leads, reglets, quoins and other matter should be cleared off the stone the moment the job is complete.

Job-work is very much more open than either book or newspaper work. Double and triple leaded work is very common, while there are great blanks scattered through much of it. Bountiful provision should be made for slugs, leads and metal furniture thus required, as well as for brass rule. The leads should be cut by pica ems and ens, ascending by the latter from about four ems to twenty-five, and then by ems to fifty. Except in a very large office it would not be desirable to have the lengths so great as that last mentioned. Thirty-eight ems, or foolscap, would be enough. Greater lengths, such as sixty-two, can be made by two twenties and one twenty-two, taking care that the union does not come in the same place for two lines in succession. Convenient places must be found for stowing away leads, as well as other sorts. It is usual in job offices to give each man a double frame, upon which cases of body type are mounted, and in the rack beneath other cases are placed. Around the room are cabinets and racks, containing the display type and the body letter not in use.

As a rule jobs should be executed in the order of their arrival. Each bears a ticket showing its reception and when it is to be done. In many cases the compositor receives instructions directly from the person for whom the work is executed. Time should be fully entered, as well as any subsequent hours on alterations. Obvious errors may be corrected, if there can be no doubt what is intended; but every precaution should be taken to prevent mistakes.

It is difficult to lay down any rule for the composition of jobs. This depends much upon the class, the number of words, their availability and the use to which the work is to be put. In a card, for instance, four inches wide, a certain amount, say a pica or great primer, must be taken off each end and the main line must then be set in something that will fill it out completely. If there are only a few lines the principal one may be of large type; if there are many it must be in comparatively small type, but wide, so as to fill the measure. A card of the size given above and two and a half inches deep would, if there are sixty words upon it, require that some of the lines shall be set in nonpareil lower case. If there are thirty words the whole may be more or less displayed; but if there are only fifteen or eighteen all must be in reasonably large type. The difficulties of the job compositor are many. His words do not come properly for display, and the true relation of one line to another is hard to show. The principal line should not be placed at the very top, and generally speaking there are catch-lines between the important ones. When the compositor is allowed to transpose the wording it can frequently be much improved; but in the majority of cases he must strictly adhere to the copy given him. As a general rule in all job-work the principal lines should be first set, and then the smaller. These main lines should not be of the same length, yet the same rule cannot be followed as in book titles, and there are many which of necessity must be full and others which are of the same length as those before them. In posters and handbills half of the principal lines are full. It is frequently an improvement to thin space the letters in words in light jobs, but very little of this should be done in heavy work. To determine what size of type should be used, say, in a displayed octavo page, where there were one hundred and twenty words, the length of the page must be measured in lines. If seven inches, there will be forty-two lines of pica or eighty-four lines of nonpareil. One hundred and twenty words fill fifteen lines of pica, if set consecutively; but the matter is broken up. The head is sunk half an inch, and with the dash after it and its leads it takes off over three-quarters more. Four or five display lines are in English, pica or great primer, and each of these takes a nonpareil or pica slug before and after, so that the room remaining for small display becomes less and less. It will probably be found that brevier will be the best type for the undisplayed matter on such a page.

It is a usual rule in job-work to contrast the lines in length, weight, size and face. The important lines take the largest type and frequently the heaviest, and so on down to the most unimportant. Words of little value, like "the," should not make the beginning of a main line. Great hollows should not usually be allowed to exist at the corners when they can be filled up by words or ornaments. Take for instance the following, a blotter distributed liberally in New York. It has at each end a cut of a well-dressed young man, which enables the words "merchant tailors" to be omitted

"Fall and Winter Styles | 1891-1892 | Schneider & Co. | 284 & 286 | Broadway and | cor. Belton & Nelson Sts. | Fabrics, Shapes, Fit, | Prices | All Correct."

There is in this the elements of a good business card or poster. Reset it should read as in the next column, the cuts not being used, and the two missing words added.

The dates occupy the extreme corners at the top, and therefore at the end of lines. The last line is also a full line; both of these are in small type. The principal lines are the name of the dealers, their business and their location. Each of these is in a different kind of type. The card might, however, be entirely set in old style, of different sizes, in capitals and lower case. There are, too, a number of other styles in which the whole could be placed. If the title of the firm were Smith & Co. the type would have to be much more extended, while if Frelinghuysen & Van Vorst it must be much thinner. There is a difficulty with the address in this card. It can be set in three lines, below each other, "and" making a catch-line, but it will then be too unimportant. By making a staircase it would give more weight, but most compositors would put all three clauses in one type, making two lines, the first the longest of the two, but both being short and in the centre of the measure. Judgment in these matters can only be attained by comparison of examples and by careful study. If the same words were to be on a poster or handbill the type would be much heavier, and more of the lines would be full lines. Color-work will take heavier lines than those in black.

1891. 1892.
FALL AND WINTER STYLES.

SCHNEIDER & CO.

284 and 286 Broadway, and
Corner Belton and Nelson Sts.,

MERCHANT TAILORS.

FABRICS, SHAPES, FIT, PRICES ALL CORRECT.

Mr. Bettis gives the following as the proper size in ems of matter to go on jobs:

Size of Paper or Card.	Width. Right to Left.	Length. Top to Bottom.
No. 3 Card, or Visiting	19	10
No. 5 Card	21	12
No. 7 Card	25	14
Postal-Card (old size)	28	16
Ordinary Note Circular	24	40
Packet Note Circular	26	45
Long Note Circular	26	55
Ordinary Letter Circular	40	55
Packet Letter Circular	42	60
Quarter Cap Circular or Blank	40	32
Half Cap Circular or Blank	40	68
Ordinary Note-Head	28	12
Packet Note-Head	30	12
Ordinary Statement	28	12
Ordinary Letter-Head	45	12
Ordinary Bill-Head	45	12
Thirty-second Dodger	21	28
Sixteenth Dodger	28	45
Eighth Dodger	42	60
No. 3½ Wedding Note or Scored Card	17	30
No. 4½ Wedding Note or Scored Card	19	34
No. 4½ Single Card	19	17
No. 3 Tag	18	10
No. 5 Tag	22	12
No. 7 Tag	27	15
Cardboard, half sheets, square	72	120
Cardboard, quarter sheets, square	72	55
Cardboard, one-eighth sheets, square	55	35

The margin is a medium one.

The foreman of a job office should sit near the door, so that he may see his customers as they come in. Every job should have a ticket telling how the work is to be done, and with spaces for the compositor to enter his time. When the composition is completed, the proof corrected and the form ready for delivery to the press-room his responsibility has nearly ended, but not quite. The first copy of the job when laid on the press is shown to him, that he may ascertain whether all of the errors are corrected.

Job Rack.—A rack for holding cases used in a job office.

Job-Room.—That part of a printing-office where jobs are executed, as contradistinguished from the book department or the newspaper department.

Jobber.—1. A job compositor. 2. A job press.

Jobbing-Cases.—Double cases made with upper and lower in one. They are sometimes made treble.—*Jacobi*. In America the term job case is most frequently used.

Jobbing-Galleys.—Galleys of various sizes and widths suitable for miscellaneous work.

Jobbing-Machines.—The small treadle platen machines.—*Jacobi*.

Jobbing-Stick.—A composing-stick with lever attachment for facilitating the changing of measures.—*Jacobi*. In America a job stick is any kind of stick used to set job-work with.

Jobbing-Types.—Faces of type used in jobbing, in distinction from those used in bookwork. This expression is little used in America. We use the term job type.

Jogging Apparatus.—A contrivance for evening the sheets of paper as they are delivered from the press by the fly, by pushing or striking the paper from two or three sides simultaneously. As one sheet lies very lightly upon the surface of another, the force required for this purpose is very slight indeed.

Johnson, Charles, an early ink manufacturer, was born in Philadelphia on January 15, 1772, and began the making of ink on January 7, 1804, with a capital of two thousand dollars. He was not a practical printer, but succeeded in producing a quality of goods which pleased the trade. Prior to this time ink was either made by the printers themselves or imported from England and Germany in skins. In 1816 his factory was destroyed by fire, the total loss being nine hundred dollars. He retired from business on March 2, 1827, and was succeeded by his son, Charles Johnson, Jr. He died on April 15, 1840. Charles Johnson was in 1844 followed by Charles Eneu Johnson, who is still in business, and is the oldest of American ink-makers.

CHARLES JOHNSON.

Johnson, Lawrence, for many years an eminent type-founder of Philadelphia, was born on January 23, 1801, in Hull, England. He entered the printing-office of John Childs & Son, in Bungay, as an apprentice, but completed his term of service when only eighteen years of age, and then removed with his father's family to America. After his father had established himself upon a farm Lawrence Johnson began labor with Bunce & Gray, in New York, where he distinguished himself by his great industry. He had an opportunity of seeing in England the operations of stereotyping, the office in Bungay being one of the earliest to take it up in Great Britain, but desired to know more about it, and in 1820 entered the employment of B. & J. Collins, who with the Bruces did nearly all of the stereotyping in New York at that time. He gained a competent knowledge of it, and determined to go into business in that line in Philadelphia. He had very little means and comparatively little experience, but his perseverance and ingenuity enabled him to conquer all obstacles. In 1833, in conjunction with George Smith, he bought the type-foundry formerly owned by Binny & Ronaldson, but later by Richard Ronaldson, and began its extension and improvement. It had fallen back somewhat in the race. More enterprising men had been at the head of the other foundries, and had to a great extent taken away its trade. His efforts were rewarded; the subsequent productions of the foundry met with much favor, and good business methods enabled the trade to be kept. In 1845 he associated with himself Thomas MacKellar, John F. Smith and Richard Smith, under the title of L. Johnson & Co. During this period they issued a very large new specimen-book, the finest which up to that time had appeared, and began the Typographic Advertiser, the first printer's paper. His death occurred on April 26, 1860.

LAWRENCE JOHNSON.

Johnson, Marmaduke, a printer sent over to New England to assist in the printing of Eliot's Indian Bible. He arrived in 1660. The last book in which he is known to have been concerned was published in 1674, and he died the next year. He seems to have been in much trouble during the few years that he was here.

Johnson's Dictionary.—This is the chief authority in printing-offices in England and the British colonies for orthography, and was first issued in 1755. Seven booksellers of London paid its expenses and held the copyright. Dr. Johnson received for his labors £1,575, out of which he paid six amanuenses, five of them being Scotchmen. He supposed that he could complete it in three years, but it really required eight. The foundation of the book was Bailey's Dictionary, but this was greatly improved. In one respect every edition of his dictionary is valuable. It shows by examples from the best authors how the words were actually used by them. Todd edited it a number of years later, and Latham, an eminent scholar, a few years ago brought out a revision which is known as Latham's Todd's Johnson. It was superseded here in the thirties by Webster, and Worcester a little later. It is not now regarded as an authority in American printing-offices.

Join Up.—To bring two or more corners close together in a border; also the closing up of two consecutive takes of copy.—*Jacobi*.

Joints.—The projection formed in backing to admit the millboards. The leather or cloth placed from the projection to the millboard is called a joint.

Jones Signature Press.—A press for pressing folded sheets, very compact in form and having much power. See illustration on page 204.

Jornada (Sp.).—The run or number of sheets printed on a work.

Journal.—A newspaper. Strictly speaking it is a daily account, but is now used for periodicals published at long as well as short intervals. It is also one of the series of books used in accounts.

Journalist.—One who writes for a journal or who conducts it.

Journeyman.—A person of mature age who is employed in a trade, and is capable of doing a fair day's work. It is opposed to apprentice, a learner.

Jumping Cases.—The neglect of a case by a substitute, imperilling the situation of his regular.

Junius, Hadrian, a Dutch man of letters, who first published a statement relative to the discovery of printing in Holland by Koster. He was born in 1511 and died in 1575. The narrative was given in the book called Batavia, published in 1588.

Justieren (Ger.).—To justify.

Justierung (Ger.).—Justification.

Justificación (Sp.).—Justification, spacing; also the movable part of a composing-stick.

Justificar (Sp.).—To justify.

Justification.—The result of justifying; the state of a line in which it is neither too hard nor too loosely spaced.

Justifier (Fr.).—To justify.

Justifiers.—Another term for quotations or large quadrats in England.

Justify.—To space out a line to any given measure so that it shall be neither long nor short.

Justifying.—Spacing lines so that the length shall be exactly what it should be. It solely relates to the length of the line, and not at all to the method by which that exact length is accomplished. The spacing may be bad, while the justification is good. A well-justified line ought not to be wider or narrower than another by more than one two-hundredths of an inch. In Germany the corresponding term, justieren, means setting the measure as well, and generally speaking those words in foreign languages which mean justifying have also the secondary meaning. The great difficulty in justification is to determine exactly when the line is of the right hardness. In a measure of fifteen or twenty ems there is so little yielding to the fifty or sixty pieces of metal which fill the line that the difference between a four and a five em space may cause the first to seem too hard and the last too soft. In a measure of forty or fifty ems the line is very likely to be soft, as if hard spaced it may bulge out in the middle and become pied. Attention and judgment must be constantly exercised to know when the measure is filled.

Justifying a Stick.—To make a stick up to a given measure.

Justifying the Head.—Justifying or scale-boarding the head is to put into the mortises in the cheeks between the upper side of the tenons of the head, and the upper side of the mortises in the cheeks, an equal quantity as to thickness of scale-boards, that when the pressman pulls the tenons of the head shall have an equal horizontal level cheek.—*Stower.*

K

K THE eleventh letter in English; one very rarely used, sharing with j, x and z this distinction. It is a little thicker than an en quadrat. In Latin K is equivalent to 250, but with a dash over it 250,000. The Spanish, Portuguese and Italians have no K, and it is infrequent in French. It formerly was used at the end of such words as musick, antick and publick, but this custom has been discarded. In the United States 1840 was about the time when the change was complete. As an abbreviation it means king, and in German K. und K. means imperial and royal.

Kansas.—One of the Central States of the United States, into which printing was introduced in 1834. The Rev. Joseph Meeker, missionary to the Ottawa and other Indian tribes, took with him an old-fashioned press and printing material to the mission farm of the Baptists, five miles east of the present site of Ottawa. He published a small missionary paper in the English and Cherokee languages. With this exception no printing was carried on within the limits of the present State until after the passage of the Kansas and Nebraska bill in 1854, as there were no inhabitants except Indians. Coincidently with the passage of the bill creating this region into a territory there was a large immigration from the older States, and many newspapers were founded, as both the pro-Slavery party and the anti-Slavery party desired to obtain control of the Legislature. The act passed in May, 1854, and in that year a settlement was begun in the town of Lawrence, and a newspaper was printed in Pennsylvania for the settlers, but dated Wakarusa, Kan., on October 21, 1854. It was called the Herald of Freedom. The second number was issued in Lawrence on January 6, 1855. Other newspapers were begun in Lawrence that year. The Herald was published at Leavenworth by W. H. Adams on September 15, 1854. In November of that year the Pioneer was issued at Kickapoo by A. B. Hazzard. The total number of newspapers and periodicals published in 1860 was 27; in 1870, 97; in 1880, 347, and in 1890, 807. In 1880 there were 20 dailies, 310 weeklies and 17 other periodicals; in 1890 there were 47 dailies, 706 weeklies and 54 other periodicals. Kansas has no very large city, nor is it in a position to draw much printing from other States. That calling is exercised chiefly in Lawrence, Leavenworth, Topeka and Wichita. Topeka is the largest in this respect. Much work goes to Kansas City and St. Louis, both in Missouri.

Kansas City.—A large city in the western part of the State of Missouri, lying on the Missouri River. It is the printing centre for Western Missouri and for much of Kansas. Twelve dailies and thirty-two other newspapers are published here. Printing has been carried on in this city since 1854.

Kapitälchen (Ger.).—Small capitals.

Kapitalsteg (Ger.).—The piece of furniture put at the head of a page.

Kapitel (Ger.).—Chapter.

Karren (Ger.).—The coffin (of a press), the bed, the carriage.

Kastenbein Machine.—A typesetting machine on the gravity system, first shown to the public in London in 1872. It is a neat and compact apparatus, made of iron, and standing about as high as a man. The different letters are arranged vertically in a series of channels of just the size to hold them. Each letter lies on its side. When the key is struck a letter is pushed out of its place at the bottom of one of the channels and falls through converging grooves to a place where it becomes a part of the line of composition. It is justified by a second operator, who takes a portion of the long line advancing towards him, spaces it properly and makes it of the right length. There are no nicks upon the type besides foundry nicks, and the distribution is effected by playing on a keyboard, each touch detaching a letter, which falls down a groove and is added to other letters of the same kind. It is the reverse of the typesetting operation. The speed in distribution is about four thousand ems an hour, which is also the speed of the compositor and justifier. Thus three expert operators are required to do forty thousand ems a day. At one time this apparatus was very largely used in Europe, and a large number of machines were imported into the United States, several going into the Times office in Chicago. It is believed, however, that none are now employed in this country. Like all typesetting machines, the Kastenbein requires careful handling and the aid of experts in order to produce its best results. It did not meet these conditions on this side. It is still used in many offices abroad.

Kattunband (Ger.).—Muslin or cloth binding.

Keep Down.—An instruction to use capital letters somewhat sparingly.

Keep In.—This is a caution either given to or resolved on by the compositor when there may be doubt of driving out his matter beyond his counting off, wherefore he sets close to keep in. Keep out, the practice contrary to the preceding.—*Stower.*

Keep Standing.—Type kept in abeyance pending possibility of use or reprint. Much type is set on newspapers which never is printed, although desirable, as it is driven out by more desirable matter. This is kept standing as long as there is possibility of use.

Keep Up.—An instruction to use capitals somewhat freely. To keep up style is to follow the usages of an office with strictness in regard to capitalizing, orthography, punctuation, hyphenizing and division.

Keile (Ger.).—Quoins.

Keilen (Ger.).—To quoin up.

Keilkasten (Ger.).—The quoin-box.

Keilrahme (Ger.).—A chase.

Keiltreiber (Ger.).—A shooting-stick.

Keimer, Samuel, was an employer of Franklin in Philadelphia. He was bred to printing in London, where he married, and leaving his wife in London came to Philadelphia, where he opened an office in 1723. His materials were an old damaged press and a small cast of worn-out English types, contained in one pair of cases. He wore a long beard and had peculiar religious notions, using a phraseology somewhat similar to the Quakers. He was unsuccessful in business, and in 1728 or 1729 removed to Barbados. Franklin characterizes him as a knave.

Kellogg, A. N., one of the inventors of the system of producing partly printed sheets, was born in 1834. He was bred as a printer. In 1861 he was publishing a weekly paper at Baraboo, Wis., when the man who worked for him went to the war. In the emergency he sent to the nearest daily paper and obtained a half-sheet supplement printed on both sides, to be folded in with his own half sheet. As he folded them together the idea came to him of having the paper in one whole sheet, with the outside or inside pages printed at the central office, as was preferred. He tried it and the business grew. In 1865 Mr. Kellogg began printing these aids himself, founding the Kellogg Newspaper Company at Chicago. At the time of his death, March 30, 1886, he was printing over one thousand different newspapers. He was fifty-four years old.

Kentucky.—One of the States lying on the Ohio River. Settlement began just before the Revolution, but all villages were very small, and no newspaper was begun before the Kentucky Gazette, at Lexington, on August 18, 1787. Printing had been carried on there from the previous year by John Bradford, and the newspaper was published by J. & F. Bradford. No record exists of the establishment of a press in most of the other towns. The total number of newspapers and periodicals issued in 1810 was 17; in 1840, 38; in 1850, 62; in 1860, 77; in 1870, 89; in 1880, 205, and in 1890, 257. The number of publications in 1880 was 11 dailies, 160 weeklies and 34 other periodicals; in 1890 there were 20 dailies, 186 weeklies and 49 other periodicals. Most of the larger work in the State is done at Louisville, or goes across the Ohio River to Cincinnati and the Mississippi to St. Louis. Frankfort and Lexington are the largest towns for printing outside of Louisville, but that is the only city which has large facilities.

Kerned Letters.—These are letters of which a portion projects over the body. The Italic *f* is the most noteworthy, being kerned at both ends. The projections are very liable to break off. At the beginning and end of stereotype lines, where a kerned letter occurs, a thin space should be inserted, so that the end may not be shaved off when the plate is trimmed. There are some words in which such combinations occur after f that thin spaces must be placed between them. To avoid this, several letters are cast together, such as fi, fl, ff, ffi and ffl, and formerly, before the abolition of the long f, there were one or two others. Several attempts have been made to get rid of this kerning, which is troublesome in the type-foundry as well as in the composing-room; but they have all been unsuccessful, although Boston foundries have been casting them for years. The best known early effort was that of Lord Stanhope about 1800, but it was again attempted in Cincinnati about 1850. The defect in the Stanhope and Cincinnati plans seems to have been that the only thing which was done was to change the curve of the beak, thus cramping it and making it deformed. It would be better to have it turn back in a curve from the beginning. There are certain badly cut fonts of type in which the plan of bearing off some letters from others must be adopted in a similar manner to that used with kerned letters, and there are occasional combinations in all languages in which this must be resorted to where f strikes against another tall letter, as in Lofborough.

Kettle-Stitch.—The chain-stitch which the sewer makes at the head and tail of a book. It is said to be a corruption of either chain-stitch or catch-up stitch, but is probably from the German Kette, a chain.

Kidder Press.—A job machine manufactured in Boston which uses a roll of paper. It feeds and cuts the paper as may be needed. Several other kinds of machines are also manufactured which are known by the same name.

King, Robert P., of Philadelphia, was born on April 3, 1815. He served an apprenticeship to printing with Lydia R. Bailey, becoming free on April 2, 1836, and after two years' work as a journeyman joined, in Sansom street, Alexander Baird, who had been a fellow-apprentice, under the firm-name of King & Baird. The house was very successful and did an exceedingly large amount of business. Mr. King mastered the German language, and they had the largest German printing-office ever conducted by Americans. He was a man of great energy, a member of many societies, twice a presidential elector, president of an insurance company, and served in several minor political offices. He died at the close of September, 1868.

ROBERT P. KING.

King's Printers.—Those persons who by royal appointment in England have executed the printing of certain privileged books. Originally these were numerous, but of late the Bible has constituted the chief work. The printers are in the following order: 1573, F. Flower; 1575, Thomas Wilkes; 1577, Christopher Barker; 1589, Christopher and Robert Barker; 1602, Christopher Barker, son of the last mentioned Robert and grandson of Christopher; 1616, Robert Barker, brother of the younger Christopher; 1627, Norton & Bill; 1635, Charles and Matthew Barker, also brothers of the younger Christopher; 1645, heirs of Christopher Barker; 1675, Newcomb & Hills; 167–, John Baskett; 1713, Tooke & Barber, to begin in 1739, but sold to Baskett; 1769, Charles Eyre; 1770, William Strahan, a share; 1799, Charles Eyre, Andrew Strahan and John Reeves; 180–, Charles Eyre and Andrew Strahan; 1830, Andrew Strahan, George Eyre and Andrew Spottiswoode, succeeded by George Edward Eyre and William Spottiswoode, the three previous members having died; 1860, George Edward Eyre and William Spottiswoode. The terms of appointment were for thirty years. For brief periods there were also other persons who had acquired interests.

Kiss.—When rollers on a machine fret against each other they are said to kiss.

Klammern (Ger.).—Brackets, crotchets; in tabular matter, braces.

Kleister (Ger.).—Paste.

Kleistern (Ger.).—To paste.

Klopfen die Form (Ger.).—To plane down a form.

Klopfholz (Ger.).—A planer.

Kneeland, Samuel, a printer in Boston who began business about 1718. He was very successful, and for twenty-five years was in partnership with Timothy Green. Much of the time they published a newspaper. The chief work of the firm was printing a Bible for Daniel Henchman. It was in small quarto and bore the imprint of Mark Baskett, in order to avoid a prosecution from those in England and Scotland who published the Bible by a patent from the crown. The fact of their printing this Bible has been doubted by bibliographers, but without good reason. Thomas relates how he knew about it and why the imprint was counterfeited. Anonymous works or works with false imprints were very frequent in printing-offices of the last century. Kneeland died on December 14, 1769, aged seventy-three.

Knib of Setting-Rule.—The nose of the rule which the compositor lifts up line by line as the type is composed.—*Jacobi*. This phrase is given thus defined to show the vagaries of English spelling. Knib is in reality nib, an old English word, coming to us from the earliest times. It is often used, as in the nib of a pen, and is the root from which nibble is derived.

Knock Up.—To make the edges of a heap of paper straight and square by striking it repeatedly on the opposite side. Jog up is more frequently used in this country.

Knocking-Down Iron.—A piece of iron having a small leg in the centre by which it is secured in the lying press. When fastened there it is used to pound or beat with a hammer the slips into the boards after they are laced in, so that they do not show when the book is covered. See FORWARDING.

Kollationieren (Ger.).—To collate.

Kollock, Shepard, the first printer of a directory in New York, was born in Lewes, Del., in 1750, and learned the art of printing from William Goddard in Philadelphia. He served in the early part of the Revolutionary War, but resigned to establish a patriot newspaper at Chatham, N. J. At the close of the war he removed to New York city and established a bookstore in Hanover square, his newspaper then being entitled the New York Gazetteer and Country Journal. In December, 1786, it was discontinued for want of support. The first New York Directory, issued by David Franks, an Irish bookkeeper, was issued in May of that year, Kollock being the printer. He also published a paper in New Brunswick, N. J., which was afterwards transferred to Elizabethtown in the same State. After a time he gave up business in New York. He published many books in that town, among others the first edition of Morse's Gazetteer. He retired from the printing business in 1818, held the position of postmaster until 1829, and for thirty-five years was a judge of the Court of Common Pleas of Essex County, N. J. He was an ardent patriot, and was for many years an elder in the Presbyterian Church. He died on July 28, 1839.

Kolon (Ger.).—Colon.

Kolumne (Ger.).—The page; gerade Kolumne, even page; ungerade Kolumne, odd page.

Kolumnenmass (Ger.).—The measure for the page.

Kolumnenschnuren (Ger.).—Page cords.

Kolumnentitel (Ger.).—The running title.

Kolumnenweise (Ger.).—In columns.

Komma (Ger.).—Comma.

Komplettieren (Ger.).—To complete.

Kondition Finden (Ger.).—To find work.

König, Friedrich, the inventor of the power-press, was a German, born in Eisleben, in Prussian Saxony, on April 17, 1775. He proved an apt student at school, and when sixteen went to Leipsic, becoming an apprentice in the printing-office of Breitkopf & Härtel. He saw how slowly the printing-press performed its labors, and devised plans, as he believed, for accelerating its motion. He was unable to get means to carry his ideas into execution, as the Napoleonic wars were in progress, and that section of the country was devastated. His merits as a workman, however, attracted attention, and he received an invitation from the Russian government to take control of an office at St. Petersburg, which was to do the state work. He went there, but found that he could not overcome the obstacles thrown into his way by officials and by red tape. He therefore returned to Germany, and shortly after went to England, reaching that country in 1807. Thomas Bensley, an eminent printer, became interested in the projects of the young German, and furnished money enough to carry on the work. A model was first constructed, and on March 29, 1810, a patent was taken out. He had as an assistant Andrew F. Bauer, another German, who was an expert machinist. Together they worked on the plans, making changes as they saw them to be necessary, until in April, 1811, it was completed, the first work printed by it being sheet H of the Annual Register, it is said at the rate of eight hundred impressions an hour. Two other London printers joined them, and a new patent was taken out shortly after, the former machine having been simplified. In this second machine the impression was given, not by a screw, but by the form alternately passing under and giving an impression at one of two cylinders at either end of the press.

A machine with a single cylinder on this model was erected and shown to the newspaper proprietors of London in 1812. John Walter of the Times was so much pleased with the exhibition that he ordered two double-cylinder machines on this plan. The construction of these machines was attended with much difficulty, owing to the lack of experience of the constructors and the opposition of the workmen, and König's path was filled with many disappointments. One was completed, however, in 1814. On November 29 of that year the Times announced that it had been printed by machinery. The pressmen in that office had been kept waiting for late news, the forms being held back, when at about 6 o'clock in the morning they were surprised by the appearance of the sheets freshly worked. They were told that the Times of that day had been printed on a machine, but that none of the men would lose anything in consequence of this, as their wages would be continued until other employment could be found for them. This machine could produce eleven hundred impressions an hour.

FRIEDRICH KÖNIG.

The partnership between König and Bensley became strained after this time. Machines were made suitable for Bensley's work, but König conceived the idea that Bensley did not desire him to be successful except so far as the machines could be used in Bensley's office. König accordingly left England, and began in 1817 with his friend Bauer the manufacture of printing-presses in the village of Oberzell, in Bavaria, where there was a building formerly used as a monastery which he was able to obtain from the government on easy terms. The workshop in Bavaria began turning out presses in 1822, the peasants having in the meantime been educated as machinists, and from that time until the present the establishment of König & Bauer has remained one of the most respectable, as well as one of the largest, press-building manufactories in Germany. König died on March 31, 1833, and was buried at his own request in the orchard adjoining the monastery. Bauer died in 1860. König's successors were his two sons, Wilhelm and Friedrich. A monument has lately been erected to him at Eisleben.

Much discussion has taken place as to the relative importance of König and Nicholson in respect to the invention of printing by cylinders. Nicholson was a scientific writer of repute who in 1790 received a patent for a machine for printing in which we may see the germ of the present printing-press; but he never took the pains to reduce his theory to practice, and his claims are like those of the Marquis of Worcester to the invention of the steam-engine. The inventor of a machine is not he who has thought out a plan, more or less imperfectly, by which a thing can be accomplished; it is he who resolutely sets to work and conquers the difficulties and shows the machine in operation. In this sense König was the inventor of the power-press. Nicholson's ideas had remained barren. Perhaps no patent was ever more fruitful in ideas than that in which he explained what might be done. The enemies of König assert that his work on the press was a failure until he became conversant with the specifications in Nicholson's patent. He then abandoned what he had been doing, and began working on the lines laid down in 1790, success attending his efforts.

The relative share which the two men had in the discovery has been discussed in a volume by William Blades in favor of Nicholson, and in another by Theodore Goebel in favor of König. All of the known facts are contained in these two volumes.

König Machine.—The first practical printing-machine designed by Friedrich König, a German.

Kopf (Ger.).—A head; the top of a newspaper. Kopftitel, a caption; also a headline or page-heading of a book, running in the same manner throughout the entire book.

Korrektor (Ger.).—The proof-reader.

Korrektur (Ger.).—The proof.

Korrekturzange (Ger.).—The tweezers.

Korrekturzeichen (Ger.).—The marks made by the proof-reader.

Korrigieren (Ger.).—To correct.

Korrigierwinkelhaken (Ger.).—A wooden contrivance used to hold the type necessary to make corrections in the form.

Koster or **Coster, Lourens Janszoon,** the supposed inventor of the art of printing in Holland between the years 1420 and 1440. The first claim for precedence for Holland in this matter came from a writer named Coornhert, and this was repeated by an Italian named Guicciardini, but it met its first detailed statement in Junius's Batavia in 1588, which is supposed to have been written twenty years before. Under other heads have been given what is really known about the invention. Junius says:

"I resume the history of our own city (Haarlem), to which, I assert, the chief honor of the invention of the art of printing is justly due; and which, I maintain, may be asserted with the greatest justice as of its own and native right. There is, however, an ancient opinion which alone eclipses our splendor, which is inscribed in the minds of some as if it had been burnt in by fire; so deeply rooted that no mattock, no wedge, no pickaxe is able to eradicate or destroy it. In conformity with this opinion they pertinaciously believe that the forms of letters with which books are printed were first discovered at Mentz, a celebrated and ancient city of Germany. Oh that I could obtain by a wish that incredible power of oratory which is supposed to have existed in Carneades, who is reported to have defended nothing he did not prove, to have attacked nothing he did not overturn—so that I, the advocate of truth, might be able to recall from exile to its native right that fugitive praise, and to raise this trophy, which indeed I would not desire on any other account but that truth, correctly designated by an ancient poet as the daughter of Time, or (as I am accustomed to call her) the test of Time, may at length be discovered, and that she, although hidden, according to Democritus, in the deepest well, may be brought to light!

"If the Phœnicians and Egyptians were not unwilling to engage in a glorious combat concerning the invention of letters: these arrogating to themselves their invention under the guidance of God, when they boast of their tables called in their language 'written by God;' and the others glorying in having introduced letters (to the invention of which they assert a claim) into Greece at the time when Cadmus, transported in a Phœnician vessel, first instructed the ignorant Greeks: if, again, the Athenians claim the same praise for their own King Cecrops, and the Thebans for Linus; while Tacitus and Philostratus bestow the glory of the invention on Palamedes the Argive; and Hyginus attributes the invention of the Latin character to Carmenta, the mother of Evander: if, therefore, all nations have not blushed to seize for themselves, as the peculiar right of each, this glory, which is involved in so much doubt and controversy, what should hinder us from reseeking the possession of that praise which cannot be disputed, and to restore it to its ancient right, of which we have been deprived by the culpable negligence of our ancestors? I am indeed uninfluenced by any feeling of envy or malevolence to assert any claim for one by calumniating or detracting from another. If, on the authority of Plutarch, the evidence of that man is most untrustworthy, who, bound by no favors received, or by any partiality or friendship, speaks boldly and freely what he thinks, my testimony is surely entitled to credit, since I claim no relationship with the dead, his heirs or his posterity, and have no favor or benefit to expect from them. In what I have undertaken I have been influenced solely by an act of justice to the memory of the dead. I shall therefore mention what I have learned from old men respectable for their authority, and distinguished by their public services, who have asserted that they had their information from the best authority, viz., their own ancestors, whose testimony ought to have due weight in determining the truth.

"There dwelt in Haarlem, about one hundred and twenty-eight years ago, in a public edifice of some magnificence (as the fabric which still remains can attest), overlooking the market-place, opposite the Royal Palace, a man named Laurentius Johannes, surnamed Custos or Æditus, because his family, by hereditary right, possessed an honorable and lucrative office distinguished by that title. To this man the world is indebted for an art more truly worthy of the laurel than that which binds the brow, for by the clearest right, and by the most solemn assertions, he is entitled to the praise of being the inventor of printing.

"Walking in a wood near the city (as was the custom of opulent citizens on festivals or after dinner), he began to cut letters on the bark of a beech tree, which he, for the sake of amusement, pressed on paper, in an inverted order, for his grandchildren to imitate. Having succeeded in this, and being a man of talent and ingenuity, he began to meditate greater things, and being assisted by his son-in-law, Peter Thomas (who had four sons, who almost all attained consular dignity, and whom I mention to show that the art owed its origin, not to a low family, but, on the contrary, to one of distinguished rank and consideration), he invented a more glutinous and tenacious kind of ink, perceiving that the common ink spread and produced blots. He then formed wooden tablets, or pages with letters cut upon them. Of this kind, I have myself seen an anonymous work, written in the vernacular tongue, entitled Speculum nostræ Salutis, the first rude essay, printed not on both sides but on opposite pages only, the reverse sides being pasted together to conceal their naked deformity. These types of beech he afterwards changed for lead, and after that for pewter, as being a more hard and durable substance; from the remains of which those old wine-pots were cast that are still visible in the mansion of which I have spoken, looking towards the market-place, and which was afterwards inhabited by his grandson, Gerard Thomas, who died a few years since at a very advanced age, and whom I here mention with respect as a most honorable gentleman. The curiosity of men is naturally attracted by a new invention; and when a commodity never before seen became an object of gainful profit, the love of the art became more general, and work and workmen (the first cause of misfortune) were multiplied. Amongst those so employed was one John Faustus. Whether he was, as I suspect, ominously so called, faithless and unlucky to his master, and whether that really was his name, I shall not here inquire, being unwilling to disturb the silent shades of those who suffer from a consciousness of the sins they have committed in this life. This person, bound by oath to keep the invention a secret, as soon as he supposed he knew the method of joining the letters together, the method of casting the types, and other matters belonging to the art, having seized the opportunity of Christmas Eve, whilst all were employed in the customary lustral sacrifices, puts together all his master's tools connected with the art, seizes all the types, elopes from his house, accompanied by one other thief as an accomplice, proceeds first to Amsterdam, then to Cologne, and at length settles at Mentz. Here he considered himself safe from the reach of his pursuers, as in an asylum where he might carry on a gainful trade with the fruits of his iniquity. Clear it certainly is, that, in about a year after this, about A. D. 1442, the Doctrinale of Alexander Gallus, a grammar in much repute at that time, and the Tracts of Peter of Spain, were brought out here with those very types which Laurentius made use of at Haarlem.

"This is the account I have heard from venerable men, worthy of credit, to whom the story had been delivered, like a burning torch transferred from hand to hand; and I have myself met many other persons who corroborate and confirm their statements by the similarity of their testimony. I remember that the instructor of my youth, Nicholas Gallius, a man distinguished by an accurate and retentive memory, and venerable for his years and character, has mentioned to me that he more than once, when a boy, heard one Cornelius, a bookbinder who had been employed in the office, and lived to the age of eighty, relate with great emotion the whole transaction, describe the history and progress of the art, and all the circumstances connected with it, as he had received the account from his master. Whenever the conversation turned upon this subject, he would burst into tears and betray most violent emotion, both on account of the robbery committed on his master, and of the glory of which he was so unjustly deprived. He used to call down the most frightful imprecations on the head of the thief, and execrate the memory of those nights which he had passed with him as his bedfellow. This account agrees pretty nearly with that of Quirinus Talesius, the Burgomaster, who had it almost immediately from the mouth of Cornelius himself. The love of Truth, so generally the parent of envy and hatred, has induced me to enter into this detail, in the defense of which, so far am I from any desire to forfeit my recognizance, that, on the contrary, I feel more determined in proportion to the odium attached to it.

"In defending it, our city will recover the honor to which it is justly entitled, and the arrogance of those who are not ashamed to lay claim to and possess the right which belongs to another, will cease. This truth, I fear, may perhaps be disregarded; but though prejudice may, amongst light and careless men, prevail above the argument which is founded upon authentic information, I shall ever derive consolation and delight from the recollection of having manfully defended the claims of this city and of the true invention."

There are a number of improbabilities in this story. Elsewhere has been given a relation of the invention of printing as derived from other sources. It would seem that the art was on its way many years before a book was published, but Koster overcame each difficulty with ease. He cut reversed types of wood, invented a more tenacious kind of ink, changed his wooden types first to lead, afterwards to pewter, and perfected his art early enough to have his tools stolen in 1441. The inventor of printing, according to the Dutch, was Lourens Janszoon Koster, a man of weight and substance, who had been sheriff and councillor. No such man lived, according to the archives of Haarlem, which are still preserved. Laurens Janszoon filled these high employments, but he died in 1439. Lourens Janszoon Koster was a tallow chandler and an innkeeper from 1441 to 1483. Repeated entries show these facts. Nothing which substantiates the statement that either of them invented or used types is to be found in the archives. A striking fact in this connection is that no printing is known to exist which can safely be attributed to him. If Haarlem was the cradle of printing it was a cradle from which the child disappeared very early. The flight of John Faustus, with the types, on Christmas Eve does not tally with what we know about Fust or about Gutenberg. The latter was not a servant or a workman. He had property of his own, and at about this time was known to be in Strasbourg. Fust was a wealthy goldsmith. Had he been a poor man in 1441, and then been employed by Koster, afterwards acquiring property, he would not have needed to have gone into partnership with Gutenberg in 1450 for carrying on printing, because he would have known the art himself and would have required no inventor or skillful artisan with him. The two books mentioned by Junius as printed in 1442 do not exist, nor have they been seen since his time. It would have been folly to flee to Amsterdam, only a few miles, with plunder. The law would have speedily righted the owner. Cornelius does not seem to have been a contemporary with the invention, but to have heard of it afterwards. A most important point is that Erasmus, the most eminent literary character of the day, himself a Hollander, ascribes the honor of the invention to Mentz. His abilities and his acquaintance were such that if there had been any valid claims on the part of Holland he would have been certain to know about them. A singular thing is that Koster did not go on with his work, even if his types were stolen. It would not have been difficult for a man of such abilities as the printer of the legend to have replaced his tools, although it would have taken time; but no printing between 1441 and 1483 in Haarlem is known. All that the archives disclose about Koster is that he was the son of Jan Koster, who died in 1436. From 1441 to 1447 he sold candles, oil and soap. He gave up this business to his sister, Ghertruit Jan Kosters dochter, and in 1451 was a wine-seller. The Count of Oostervant had a dinner on October 8, 1453, at his house; in 1474 he paid war taxes; and in 1483 he paid toll on his goods at the ferry when he left town. It is not known when or where he died. A dining association in Haarlem enters his name in 1436 as successor to his father. In 1484 his rights in the association had passed into other hands. There is a pedigree extant, made about 1450, which contains a claim for Koster. It says: "Sijn tweede wijff was Lourens Janssoens Costers dochter, die de erste print in die werlt brocht Anno 1446." Being translated it is: "His second wife was Lourens Janssoens Coster's daughter, who brought the first print into the world in the year 1446." This is not as early a date as Junius gives, and the word print may have meant a block-book, an image-print, a playing-card, or a book from movable types. It does not assert the last, and the other forms of printing, it is well known, had then been in existence for some time. Little importance, however, can be attached to this pedigree, as it was compiled so long after the events it relates and probably from hearsay. Nothing more is known about Koster in any way.

Since Junius proclaimed his belief in the invention of printing by Koster that faith has been accepted by the Dutch nation. Innumerable festivals and celebrations of the discovery have been made in the various cities of Holland, and its authenticity has been inculcated steadily there. Meerman was the first principal writer who sought out additional particulars corroborative of the account of Junius and placed the details before the world. One circumstance that he dwelt upon was a statement in an old English book that Frederick Corsellis, who had been a workman at Haarlem, escaped to England, and there began the art of printing at Oxford, some six years earlier than Caxton did at Westminster. As we have no productions from Haarlem in the years between 1450 and 1470 it was supposed that this would supply the missing link between Koster and the later known printers in Haarlem twenty years later. But Atkyns declares that the printer in Haarlem was Gutenberg, and an examination of his book, with its evidences, shows that most of it is fabricated, and that there is no reason for believing that Oxford had a printing-office about 1468 or Haarlem one about 1460. The assertions of Meerman, however, have since been followed by all Dutch writers except Van der Linde, and the faith in the so-called "Koster legend" is still unshaken there.

A statue was lately erected to Koster in Haarlem. Upon the pedestal is the following inscription:

LOURENS JANSZOON COSTER.
—
HOMAGE OF THE
NETHERLAND NATION.
MDCCCLVI.

INVENTOR OF
THE ART OF PRINTING
WITH
MOVABLE LETTERS
CAST OF METAL.

Another statue is in the public gardens.

Krehbiel, Charles J., a printer of Cincinnati, was born at Cleveland, Ohio, on February 26, 1849. He is the eldest son and first child of the Rev. Jacob Krehbiel, an eminent minister of the Methodist Episcopal Church, and long the editor of the Christian Apologist, the organ of the German-speaking Methodists, who died on July 19, 1890. In early life he had himself been a printer. Charles J. Krehbiel attended the public-schools of Cleveland until his fourteenth year, when he became roller-boy to the hand-pressman in the poster department of the Cleveland Leader job-rooms. He remained there until he had acquired a good knowledge of presswork as it was practiced a generation ago, and then entered the composing-room of the same office. He was discharged because of his refusal to take a case in the news-room when his comrades were on strike for better pay. He served afterwards as an apprentice in the job office of George S. Newcomb & Co. in Cleveland, and in the office of the Toledo Blade, removing to Cincinnati and there being employed as a journeyman in the pressroom of John Sauner, and subsequently in the composing-room of the Methodist Book Concern. In 1873 he entered into partnership with James S. Moss, under the firm-name of Krehbiel & Moss. On the death of Mr. Moss a few years later Mr. Krehbiel became sole owner of the business, which is that of general book and job work of the best kind. He has repeatedly been a delegate to the annual conventions of the United Typothetæ, is president of the Cincinnati Typothetæ, and is also the president of one of the leading fire insurance companies in that city.

CHARLES J. KREHBIEL.

Kreuschen (Ger.).—The cross (of a chase).

Kulshenko, David, the greatest Russian printer, was born in 1830, and began work as a roller-boy. His employer was General Davidenko, who took an interest in him. He made him clerk and bookkeeper, and finally rented his office to him. It is located in Kieffe, in Southern Russia. The building is the finest structure in the city. He carries on letter-press printing, engraving, lithography and binding. Nearly a thousand hands are employed.

Kupferstiche (Ger.).—Copperplates.

Kurbel (Ger.).—The rounce.

Kurbelriemen (Ger.).—The leather straps below the bed in a hand-press which are wound and unwound as the form goes in and out.

Kursiv (Ger.).—Italic. This is also spelled Cursiv; Kursivschrift, the Italic characters.

L

L THE twelfth letter, is employed with medium
frequency. In lower case it is as thin as any
letter of the alphabet, and sometimes does not
exceed a fifth of an em in thickness. The
capital bears no resemblance to the lower
L in Latin signifies 50, and with a dash over it
. £, the English mark for pound sterling, is an
l signifies libra, the Latin for pound. The other
f pound, that of weight, ℔, is from the same word.
k catalogues, against the imprint, l. signifies loco,

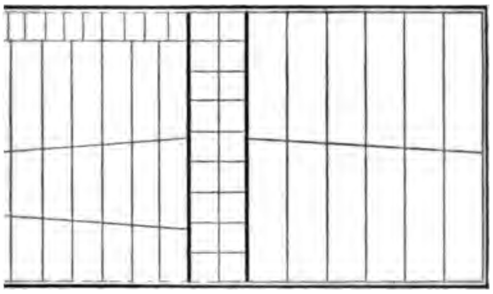
P.—Abbreviation for large paper copies of works.

oel.—A small piece of printed paper affixed to a
, jar, box, &c. Labels are often printed by lithog-
and the rolling press, and are always intended to
amental, all of the resources of the printing-office
lavished upon them; many are done in colors.
24 by 38 offers the best assortment for ordinary
; 20 by 24 inches is the size for fine colored print-
pers, and also of painted or enameled papers. For
for writing-paper 17 by 22 inches presents the best
ment of suitable thickness and price. Much of the
a label printer consists in knowing what papers can
d and how the sheets can be cut up. A large order
els can only be done with proper economy by elec-
ing.

oel Punches.—Sharp steel dies of various shapes
tting labels in quantities.

oeurs (Fr.).—Jobs.

bor-Saving Rules.—Brass rule cut up into cer-
eterminate lengths, usually multiples of nonpareil
a, but occasionally of other sizes. The type-found-
d furnishing-goods men manufacture labor-saving



LABOR-SAVING RULE CASE.

n all of the various faces that may be required, and
erent thicknesses. The most usual kinds are dot-
ght, light and heavy, parallel light, and light,
, and light. They are cut in lengths of two, two
half and three ems, and so on up to forty or fifty
n the light faces, and for such sizes as may be de-
ed on the heavier faces. Founders will also supply
in which certain small or large pieces shall be omit-
Many founders stamp the size of the piece on its
o that the person who distributes may be able to
e proper place in which each piece should be put
without measuring. Labor-saving rule is usually kept in cases made for that purpose, the small pieces being sandwiched between the places required for the large pieces. Right and left mitred pieces are also cut.

Labor-saving rules were first thought of by Houghton, an ingenious English printer, about 1846. They came into use about 1854 in this country, and have been extensively employed ever since. In job-work they are indispensable. Fifty years ago compositors cut their rules with shears, and then dressed them with files. Few could do this accurately, and a printing-office rarely had good shears kept in a proper condition. Rules were then always cut a trifle long to allow for the dressing. Since the introduction of labor-saving rule table-work has become as easy to set as any other. There is, however, much fine work upon which this kind of rule is not desirable. It is a good usage to have no join in a rule, and a size which has not been furnished will often be required. After the rule has been used for some time the joining becomes painfully apparent. For these reasons the Congressional Printing-Office, which does more tabular work than any other, does not allow labor-saving rule to be used in composition. Single pieces are required, and these must be cut in the office.

Laced In.—When the mill-boards are attached to the volume by means of the slips being passed through holes made in the boards, they are said to be laced in or drawn in.

Ladies' Cards.—The particular cards used for this purpose in England are smalls, size 3½ by 2½ inches. Any cards used for ladies' addresses are sometimes thus called in America.

Lage (Ger.).—The gathering.

Lagen Machen (Ger.).—To lay down the gatherings.

Lagerman, Alexander, an inventor, is a native of Sweden, and is about fifty-six years of age. He was educated as an engineer, and many years ago made such inventions in manufacturing matches that all previous methods were abandoned. By his plan the cutting of the wood into pieces, splitting it apart, coating the parts with sulphur and phosphorus, tying up the perfected matches and papering are all automatic. He early had his attention called to typesetting machines, and after twenty years of toil invented one, which was used both in England and Sweden. In the latter country it met with more favor than in the other, as English compositors showed no desire to have it work with speed. Mr. Lagerman became convinced that he had not attacked the problem rightly. Too much depended upon the compositor, and he therefore determined to produce a machine which would facilitate the workman's labor and make him anxious for its employment. After three years he produced the small machine described in the next article. In it the type are caught and turned as they would be by a blind compositor, solely by the sense of feeling, but much more quickly, certainly and thoroughly. He is also the inventor of many other mechanical contrivances. His residence is at Jönköping, in Sweden, where he is the consulting engineer of the match works, the largest in the world.

Lagerman Typotheter.—This is the title of a small machine designed as an adjunct to the compositor, by which he can use both hands for setting. It consists of a funnel, a feeling apparatus, tumbling contrivances, an ejector and a movable galley. The whole does not occupy in space more than a foot square, and weighs less than fifty pounds. The funnel is fixed in front of the space box or letter t of the case, and the remainder of the mechanism is under the case. Seizing the letters with the right and left hands alternately, they are dropped into the funnel, which is lined with leather or some other smooth material. It is not of consequence how the characters are grasped, whether upside down or not, as the machine finally rights them. When the letters fall to the bottom of the channel they are caught by fingers and moved along. If the nick is to the front and down the type is released at a certain distance and seized by other fingers, which move it to the point of ejectment; but if the nick is not in the right place the letter is turned either once or twice, as may be desired. If right it passes little projections; if wrong, it is reversed or turned around. When it meets the letters which have gone before all alike have their nicks downward and outward. An error does not occur in ten thousand letters. When the fingers cease to hold the type a rapidly moving ejector, going back and forth like a fan, pushes forward the letter and the line of which it forms a part. When a line is nearly completed a bell rings; the compositor drops in a space higher than the line, and when this arrives against the galley the mechanism forces forward the words upon the galley, which is open on that side. This receptacle, as soon as it has received this portion of matter, drops down one line. Between these characters, then unjustified, and the next is a partition like a brass lead, which is a part of the galley. When the receptacle is full it is taken to another place, where the lines are pushed off into a stick, there being justified by hand.

It is not supposed that by this contrivance as great a rate of speed can be attained as by the larger and more ponderous machines. The compositor by its use does not need to look for the nicks upon the type which he is setting, and he can use both hands in picking up. It is supposed from trials made that this saving will be from 80 to 90 per cent. Justification takes as long as at present, as does distribution. Altogether it is believed that three compositors will do as much as five can now accomplish. A justifying-machine has been completed, but not yet shown in this country, although used in England. It justifies eight lines a minute.

Laid Down.—A print strengthened by having a piece of paper pasted on its back. Such a print is depreciated as compared with others not so treated.

Laid Paper.—Paper having lines water-marked or running through at equidistant intervals, these lines being thin places caused by the pressure of wires fastened to the exterior of the dandy-roll or wire-covered cylinder on the paper machine, under which the paper passes and by which it is pressed.

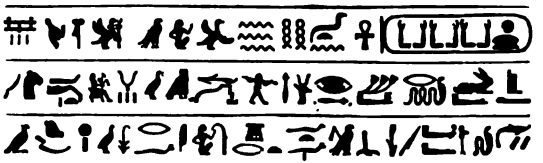
Laid Up.—When a form is printed off and required for distribution it is said to be laid up when washed, placed on the board and unlocked. The same term is applied to a form placed on the imposing surface and ready for correction.

Laminoir (Fr.).—A machine to roll paper with pressure so as to give it lustre.

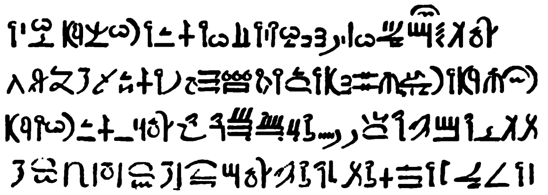
Lampblack.—The substance used in printing-ink to give it a black color. It is the soot derived from smoke. It is characterized by a total absence of crystalline structure, and by the exceedingly minute state of division of which it will admit. It may be prepared by burning organic matters rich in carbon with an imperfect supply of air and providing means for collecting the dense smoke or coal produced. The substance now most used from which this pigment is obtained is coal-tar, but many other substances are employed.

Lang-Duodez (Ger.).—Long twelves.

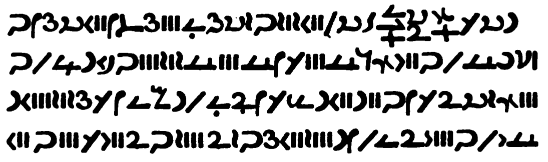
Language.—The means by which the thought of one mind is conveyed to another. Among rude and uncivilized nations this is chiefly by spoken words and by signs, the signs being the substitutes for words or ideas. These signs are very numerous among some nations, and many tribes which do not understand the spoken words of each other can perceive the meaning of a series of signs. Lists have recently been compiled of such signs. To some extent they are used among the most civilized nations, as, for instance, beckoning for "come hither," and holding up a finger to express one and two fingers to express two. Among deaf-mutes there is a very elaborate system of signs by which many abstract ideas can be represented. Thus Dr. Gallaudet can preach a discourse and at the same time explain his meaning to those of his congregation who do not hear. The words are not generally individualized. Mutes have also a character alphabet taught in all of their schools. All sounds are not reduced to writing, even in the English, French and German languages, and some express ideas without being translated into words. Before the Spaniards and English came to America the Indians had methods of representing ideas by drawings. So many suns meant so many days; a certain number of persons in one posture meant so many captives. Still another method of representing languages was hieroglyphically. At the present day, however, we generally mean by language the spoken sounds used for the purpose of communicating ideas, and, secondly, the written or printed characters which answer as a substitute for them. The latter, however, do not exactly represent the former.



HIEROGLYPHIC.



HIERATIC.

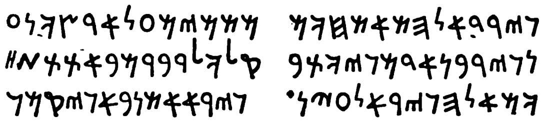


DEMOTIC.

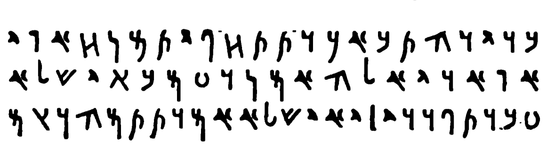
ⲡⲉⲛⲓⲱⲧ ⲉⲧ ϧⲉⲛ ⲛⲓⲫⲏⲟⲩⲓ· ⲙⲁⲣⲉϥⲧⲟⲩⲃⲟ ⲛϫⲉ ⲡⲉⲕⲣⲁⲛ
ⲙⲁⲣⲉⲥⲓ ⲛϫⲉ ⲧⲉⲕⲙⲉⲧⲟⲩⲣⲟ. ⲡⲉⲧⲉϩⲛⲁⲕ ⲙⲁⲣⲉϥϣⲱⲡⲓ ⲙⲫⲣⲏϯ
ϧⲉⲛ ⲧⲫⲉ ⲛⲉⲙ ϩⲓϫⲉⲛ ⲡⲓⲕⲁϩⲓ. ⲡⲉⲛⲱⲓⲕ ⲛⲧⲉⲣⲁⲥϯ ⲙⲏⲓϥ ⲛⲁⲛ
ⲙⲫⲟⲟⲩ· ⲟⲩⲟϩⲭⲁ ⲛⲉⲧⲉⲣⲟⲛ ⲛⲁⲛ ⲉⲃⲟⲗ ⲙⲫⲣⲏϯ ϩⲱⲛ
ⲛⲧⲉⲛⲭⲱ ⲉⲃⲟⲗ ⲛⲛⲏⲉⲧⲉⲟⲩⲟⲛ ⲛⲧⲁⲛ ⲉⲣⲱⲟⲩ. ⲟⲩⲟϩ
ⲙⲡⲉⲣⲉⲛⲧⲉⲛ· ⲉϧⲟⲩⲛ ⲉⲡⲓⲣⲁⲥⲙⲟⲥ ⲁⲗⲗⲁ ⲛⲁϩⲙⲉⲛ ⲉⲃⲟⲗϩⲁ

COPTIC.

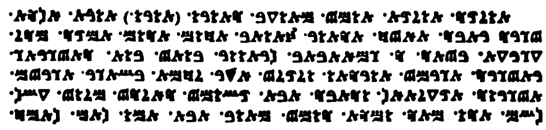
Two theories of the origin of language exist. One is that the words were received by Divine interposition, and the second is that they were a growth, the original language being a reproduction of the sounds of nature, bearing some relation to the thing itself. Thus, taking the example given in one of our chief encyclopædias, where an English visitor endeavored to ascertain from a Chinese waiter some idea as to the substance of the dish he was eating, he inquired: "Quack, quack?" and received for answer "Bow-wow!" In this case the knowledge was definite, but it could not be extended on the same lines. How could an apple, an orange, a pear and a peach be distinguished? Most of any language must have been a growth. The miraculous origin does not imply that more than a few words were given, and intercourse can be carried on with very few words. As civilization advances ideas are more complex. A recent English writer asserts that the ordinary peasant of that country, the Devonshire or Somersetshire clodhopper, knows no more than two hundred words, and a recent American writer declares that he can make the tour of any country with no more than fifty words. These are exaggerations, but the necessary words in any tongue are few. In talking with an Indian the word "cow" would be sufficiently near to include the entire bovine genus. But we have cow, calf, ox, bull, heifer and steer, and for their flesh beef and veal. Every increase in knowledge, in comfort, or in relationship of one thing to another, increases the number of words which apply to a certain subject. Thus the entire Hebrew Scriptures have less than four thousand words, but modern theology requires fifty thousand. English words are increasing at the rate of several hundreds a year.



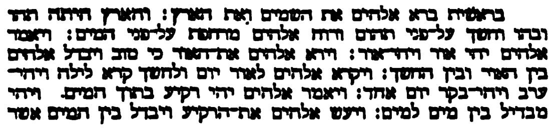
PHŒNICIAN.



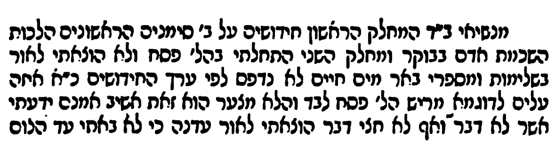
OLD ARAMAIC.



SAMARITAN.

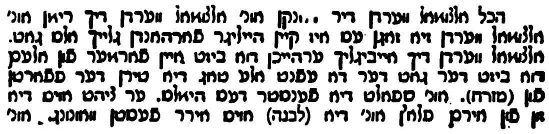


HEBREW.

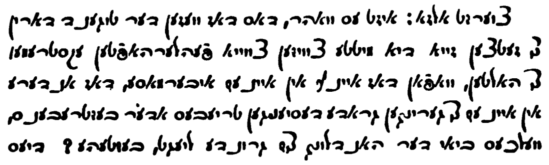


RABBINIC.

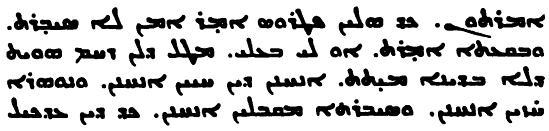
Multitudes of these words have no other existence than to the eye. No one ever heard any other person say "huzza!" except in a reading lesson, and there are thousands of once common words which are dead, except as they may be preserved in the writings of those who love archaic forms, like Tennyson. The multiplication of these words demands vocabularies in which they shall be preserved, and lexicons in which they may be defined. Grammars are troubled with their irregularities, and orthoepists find it difficult to pronounce them. Thus, as has been shown by actual enumeration, there are only ten thousand words in an English dictionary, excluding all except one form of a word, and omitting words which would not be understood by persons who had not received a better education than ordinary. Our late dictionaries contain from one hundred and fifty thousand to two hundred thousand words, and all of the forms and permutations are used. Change, for instance, is given in the past tense and participially, as changed and changing; it is negatived, as unchanged and unchanging; these have suffixes, as changeable and unchangeable, changeful and unchangeful, and other words and terminations are added, as changeling and changeless. One recent dictionary has twenty words formed from change. Additions are continually being made.



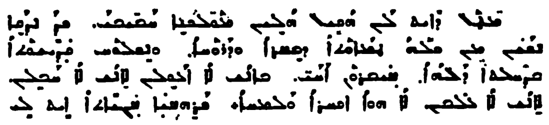
GERMAN HEBREW.



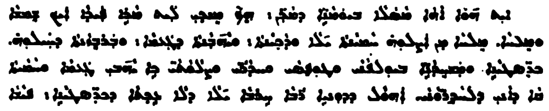
JEWISH MANUSCRIPT.



OLD SYRIAN.

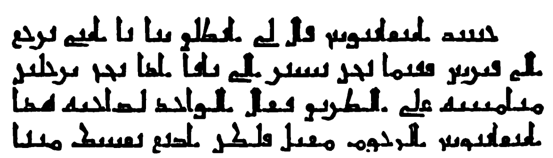


SYRIAN.



NESTORIAN.

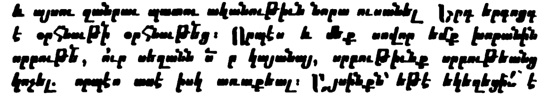
It is easy to understand with the examples before us in English how variations in language can arise, and how in the end new languages are finally evolved. Differences in pronunciation separate one part of a nation from another. There is no doubt that the Scotch ane, English one and German ein are the same word, with different pronunciations. Ship in English is Schiff in German and the same in Dutch; but in the latter language it is pronounced as we do skiff in English. Thus the same word going through another language makes two words in English. This change of pronunciation was first reduced to a rule by the celebrated philologist Grimm, and from him is known as Grimm's law. The difficulty which one nation has in pronouncing words perfectly easy for another induces it to change its words to suit the vocal organs. Thus the Irishman says say for see, tay for tea, fate for feet. The Welshman says ss for z, pronouncing hiss for his, wass for was. The Somerset man substitutes z for s, as zay for say, zed for said, zake for sake; but the changes which will separate one language from another must be much wider than this. If from the same root, the other changes must have become great. New roots have been admitted from other sources, new pronunciations of old words are common, words are cut down and are differently compounded, and there are variations in the syntax. The declensions and conjugations become different. Cognate forms reappear, as in Dutch the word "ulieden" and the expression in the Southern States, "you-uns." The latter is "you ones" and the former is "you people." Yet in classical English no sign of this collective plural appears. In New York the rowdy uses a d for th in words like "with" and "them." This has sprung up within the century. The cockney dropping of the h does not seem to have existed to any extent when the United States were settled, as this perversion has no hold here. The letter r seems to be going out of use, both in England and America, except at the beginning of syllables. Fewer people pronounce it distinctly, farmer being spoken fahmuh, and other words in a similar manner.

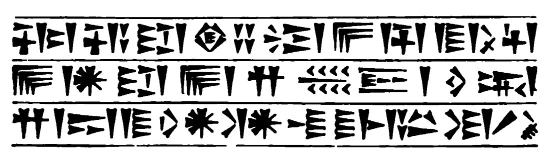

KUFIC.

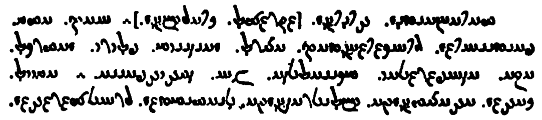
١ الٓ غُلِبَتِ ٱلرُّومُ ٢ فِي أَدْنَى ٱلْأَرْضِ وَهُمْ مِنْ بَعْدِ غَلَبِهِمْ سَيَغْلِبُونَ
٣ فِي بِضْعِ سِنِينَ لِلّٰهِ ٱلْأَمْرُ مِنْ قَبْلُ وَمِنْ بَعْدُ وَيَوْمَئِذٍ يَفْرَحُ ٱلْمُؤْمِنُونَ
٤ بِنَصْرِ ٱللّٰهِ يَنْصُرُ مَنْ يَشَآءُ وَهُوَ ٱلْعَزِيزُ ٱلرَّحِيمُ ٥ وَعْدَ ٱللّٰهِ لَا يُخْلِفُ
ٱللّٰهُ وَعْدَهُ وَلٰكِنَّ أَكْثَرَ ٱلنَّاسِ لَا يَعْلَمُونَ ٦ يَعْلَمُونَ ظَاهِرًا مِنَ ٱلْحَيَوٰةِ ٱلدُّنْيَا

عَنْ بَعْضِ ٱلْأُدَبَاءِ قَالَ حَضَرَ مَلِكُ ٱلرُّومِ عِنْدَ ٱلْمُتَوَكِّلِ
فَٱجْتَمَعْتُ بِهِ فَقَالَ لَمَّا أُحْضِرَ ٱلشَّرَابُ مَا لَكُمْ مَعَاشِرَ ٱلْمُسْلِمِينَ
قَدْ حُرِّمَ عَلَيْكُمْ فِي كِتَابِكُمْ ٱلْخَمْرُ وَلَحْمُ ٱلْخِنْزِيرِ فَعَمِلْتُمْ
بِأَحَدِهِمَا دُونَ ٱلْآخَرِ فَقُلْتُ لَهُ أَمَّا أَنَا فَلَا أَشْرَبُ ٱلْخَمْرَ فَسَلْ

ARABIAN, TURKISH, PERSIAN, MALAYAN (TWO SIZES).

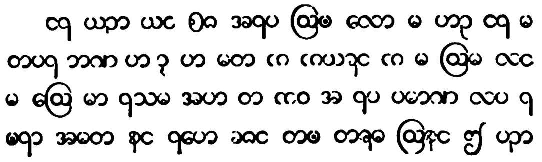

ARMENIAN.


ASSYRIAN ARROW-HEADED CHARACTERS.


ZEND.

१ आरंभ में वचन था और वुह वचन परमेश्वर के संग था और वुह वचन
२ परमेश्वर था। वुही आरंभ में परमेश्वर के संग था। ३ सब कुछ उससे रचा गया
था और उस बिना कुछ न रचा गया जो रचा गया। ४ उस में जीवन था और वुह
जीवन मनुष्यन का उंजियाला था। ५ और वुह उंजियाला अंधियारे में चमकता है
और अंधियारे ने उसे न बूझा। ६ युहना नाम एक मनुष्य परमेश्वर की ओर से

SANSKRIT (DEVANAGARI).


BURMAN.

Ἔνθ' αὖ Τυδεΐδῃ Διομήδεϊ Παλλὰς Ἀθήνη δῶκε μένος καὶ θάρσος,
ἵν' ἔκδηλος μετὰ πᾶσιν Ἀργείοισι γένοιτο, ἰδὲ κλέος ἐσθλὸν ἄροιτο. δαῖέ
οἱ ἐκ κόρυθός τε καὶ ἀσπίδος ἀκάματον πῦρ, ἀστέρ' ὀπωρινῷ ἐναλίγκιον,
ὅστε μάλιστα λαμπρὸν παμφαίνησι, λελουμένος Ὠκεανοῖο· τοῖόν οἱ πῦρ
δαῖεν ἀπὸ κρατός τε καὶ ὤμων· ὦρσε δέ μιν κατὰ μέσσον, ὅθι πλεῖστοι

Ἔνθ' αὖ Τυδεΐδῃ Διομήδεϊ Παλλὰς Ἀθήνη δῶκε μένος καὶ
θάρσος, ἵν' ἔκδηλος μετὰ πᾶσιν Ἀργείοισι γένοιτο, ἰδὲ κλέος ἐσθλὸν
ἄροιτο. δαῖέ οἱ ἐκ κόρυθός τε καὶ ἀσπίδος ἀκάματον πῦρ, ἀστέρ'
ὀπωρινῷ ἐναλίγκιον, ὅστε μάλιστα λαμπρὸν παμφαίνησι, λελουμένος
Ὠκεανοῖο· τοῖόν οἱ πῦρ δαῖεν ἀπὸ κρατός τε καὶ ὤμων· ὦρσε δέ μιν

GREEK (TWO SIZES).

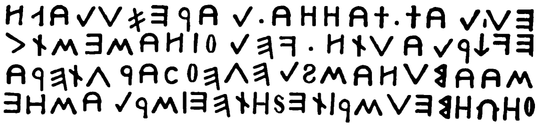
The languages of the world are thought to be about three thousand, but in this computation very slight differences make a new language. Thus Scotch (Lowland) and English, Dutch and Belgic, Erse and Gaelic are esteemed different languages. Three families of languages have a considerable literature, the Indo-European group, the Semitic and the Chinese-Japanese. The first, of course, is much the largest. Many attempts have been made to classify the existing speeches of the world, but it seems more difficult for the philologists of the present day to do so than it appeared to be half a century ago. Many points then thought settled are now regarded as unsettled. Much labor has been expended of late in obtaining vocabularies and specimens of the less known languages, and the Bible or portions of it have been translated into many of them. Perhaps five hundred languages in all have given employment to the printing-press. The most considerable collection of languages printed in one book in any English-speaking country is the Lord's Prayer in Three Hundred Languages, published by Messrs. Gilbert & Rivington of London. Some extracts have been taken from it for this work. The American Bible Society and the British and Foreign Bible Society have done much in preserving specimens of minor languages. The most considerable languages, judged by the number of people who speak or have spoken them and the literature which they contain, are the Greek, Latin, French, German, Spanish, Portuguese, English, Russian, Italian, Arabic, Chinese, Japanese and

Hindoostanee. To these for special purposes may be added Hebrew and Sanskrit.

To learn languages thoroughly requires a good ear, a retentive memory, natural facility in the combination of words, and much practice. The language must be read and talked constantly, and differences must not be confounded. It is frequently impossible to explain them, and they must be learned by repetition. There are supposed to be about sixty sounds in all employed in human speech, no one language having over three-quarters of them. Dissimilar spellings may hide identity in pronunciation, as in German Haus and in English house. On the other hand identical spelling may have different pronunciations. Thus still is pronounced by most Germans shtill, man is pronounced as a Scotchman would say mon, and wind nearly as veent. Familiar forms are altered or gone. In German or French there is only one way to say I sing, I am singing, I do sing. The definite article is omitted, as in Latin; words without meaning are inserted to round out the sentence, as in Italian; cases are indicated by changes in the endings of words, as in Latin, Greek and German, instead of being denoted by prepositions, as in English and French. In some languages, like Greek, there are three numbers; others have a multiplicity of personal pronouns, like Italian and Dutch; and many transpose the verb to a position which seems wrong to an English-speaking person. The following is an example in Dutch, taken from Joshua ix. 9:

ΤΟΥ ΔЄ ΙΗϹΟΥ ΓЄΝΝΗΘЄΝΤΟϹ ЄΝ ΒΗΘ-
ΛЄЄΜ ΤΗϹ ΙΟΥΔΑΙΑϹ ЄΝ ΗΜЄΡΑΙϹ ΗΡΩΔΟΥ
ΤΟΥ ΒΑϹΙΛЄΩϹ ΙΔΟΥ ΜΑΓΟΙ ΑΠΟ ΑΝΑΤΟΛΩΝ
ΠΑΡЄΓЄΝΟΝΤΟ ЄΙϹ ΙЄΡΟϹΟΛΥΜΑ ΛЄΓΟΝΤЄϹ
ΠΟΥ ЄϹΤΙΝ Ο ΤЄΧΘЄΙϹ ΒΑϹΙΛЄΥϹ ΤΩΝ ΙΟΥ-

INSCRIPTION GREEK.

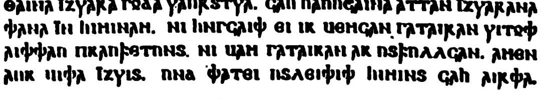


ETRURIAN.

They now said to him: Your servants are out (of a) very far land come, on account of the name of the Lord your God; for we have his fame heard, and all what (that) he in Egypt done hath.

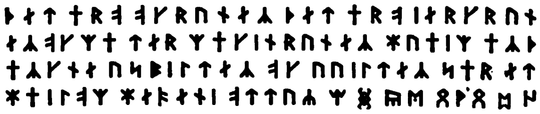
The strong resemblances between all of the languages of the Indo-European family are shown by the following table, giving the numerals in Sanskrit, Latin, Russian, Gothic, German and Welsh:

words in the foreign tongue with the words in English. Here and there from the beginning substantial identity can be perceived in some of them, and practice will soon render ninety-nine one-hundredths easy of comprehension.



MOESO-GOTHIC.

This, however, gives one very little grammatical knowledge, which must be obtained from grammars. Study of both should be followed at once. To acquire a speaking knowledge neither of these plans will avail.

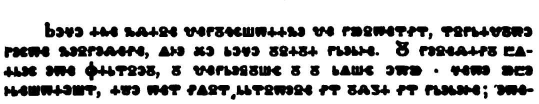


RUNIC.

The method most usually attempted for this purpose is that of Ollendorff, which is good as far as it goes. It consists of interrogatories and their answers, arranged progressively with regard to their difficulties and grammatical relations. Where teachers can be obtained this is perhaps as useful a method as is known. Dryden, however, pointed out many years ago that in translation the words were not the units, but the sentence. So no one really obtains familiarity with the spoken language until he knows a multitude of sentences which convey their meaning to him without translation in his mind, and which he can speak without requiring to exercise thought. Such sentences should be memorized by hundreds, and they should always be short. When they are learned larger ones can be constructed from them with the utmost ease. Thus, to borrow from a recent book,

Þa ne mihte Iosep hine lenȝ dýrnan, ac he draf ealle þa Eȝiptiscan ut, þaet nan fremde man be-twýx him naere: And he weop, and clýpode hludre stefne, and þa Eȝiptiscan ȝe-hýrdon, and eal Pharaones hired. And he cwaeð to his ȝe-broðrum: Ic eom Iosep; lýfað ure faeder nu ȝit: þa ne mihton his ȝe-broðru

ANGLO-SAXON.



BULGARIAN.

	Sanskrit.	Latin.	Russian.	Gothic.	German.	Welsh.
1	Eka	Uno	Ono	Ain	Ein	Un.
2	Dwa	Duo	Dva	Tva	Zwei	Dau.
3	Tri	Tri	Tri	Thri	Drei	Tri.
4	Chatvar	Quattuor	Cheturi	Fidvor	Vier	Pedwar.
5	Panchan	Quinque	Pyat	Fimf	Fünf	Pump.
6	Shash	Sex	Shest	Saihs	Sechs	Chwech.
7	Saptan	Septem	Sem	Sibun	Sieben	Saith.
8	Ashtan	Octo	Osm	Ahtau	Acht	Wyth.
9	Navan	Novem	Devyat	Niun	Neun	Naw.
10	Dasan	Decem	Desyat	Taihun	Zehn	Deg.
20	Vinsati	Viginti	Dvatzat	Tvaitigjus	Zwanzig	Ugain.
30	Trinsat	Triginti	Tritzat	Thrijetigive	Dreissig	Degar.
100	Satam	Centum	Sto	Taihuntehund	Hundert	Cant.

NUMERALS IN SEVERAL LANGUAGES.

To acquire a language needs great application. Facility in reading may be obtained, where a text-book cannot be had, by getting a Bible and carefully comparing the such phrases as "Open the door; shut the door; close the door softly; turn the handle; wipe the handle; don't slam the door," are easy to learn and can always be remembered, while long sentences cannot be, as for example: "When you go to the door always remember to close it softly, so that there will be no jar." While the first sentences will come almost intuitively, the second would require some time to learn, and phrases like those used in philosophical books could not be learned in less than a year or two. Reading should be incessant; conversation should be carried on with any one who will talk, and writing should begin as soon as possible. A good method in the latter is to obtain an approved translation of some English classic, the student turning the same book into the foreign tongue and afterwards comparing his work with the book. No competent knowledge of a language is attained by a course in Ollendorff and reading five or six books in addition. Only a fraction of the language is thereby learned.

[illegible]

CROATIAN.

Бѣ свѣтъ истинныи, иже просвѣщаетъ вьсякого чловѣка градѫщіа въ миръ. Въ мирѣ бѣ, и миръ тѣмь бысть, и миръ ѥго не позна. Въ своя приде, и свои ѥго не пріяша. Ѥлико же ихъ пріятъ и, дасть имъ область чадомъ божиѥмъ быти, вѣроующимъ въ имѧ ѥго, иже ни отъ кръви ни отъ похоти плътьскыя ни отъ

CYRILLIC.

Пепін чел скꙋрт ꙟнълцат ꙟн тронꙋ атът прін мерітꙋ съꙋ кът ші прін доріінца Францеціілор съ сіаі а съ арътa дестоінік де ачастъ ꙟнълцаре кърмꙋінд кꙋ ꙟнцелепчіꙋне. Ꙋл фъкꙋ ръсвоіꙋ кꙋ Ꙗстолф, краіꙋ Ломбарділор, пентрꙋ

WALLACHIAN.

Сократъ до тридцати лѣтъ упражнялся въ ремеслѣ отца своего т. е. въ рѣзномъ художествѣ. По томъ, предавъ себя наукамъ, превзошелъ въ оныхъ своихъ современниковъ, а особливо въ понятіи о Богѣ, и во нравоученіи. Имѣвъ мѣсто въ Аѳинскомъ правленіи не

RUSSIAN.

We give in this article specimens of the type used in many of the languages of the world. Some are represented upon other pages, but in general it may be said that where a language has lasted for a long time there are wide differences at different periods and in different places in the forms of its letters.

Lanston Machine.—An ingenious type casting and setting machine invented by Tolbert Lanston, and first shown to the public in 1889 or 1890. It consists of two parts. When copy arrives in a composing-room it is taken by the operator to a machine which in some respects resembles a typewriter, although larger. Here he operates upon the keys until the take is finished. The keys, however, instead of causing letters to be stamped upon paper, perforate a roll, each letter being represented by one, two, three or four little marks. When the copy is completed it is taken to the principal machine, where each particular mark causes a corresponding movement, insuring the presentation of the proper letter on the matrix plate. This is a square upon which are engraved each of the letters of the alphabet and the subsidiary marks. When a letter is to be cast the plate is moved up and down, or sidewise, so that the right matrix is against the mouth of the mold. As soon as it reaches the exact spot motion ceases, the matrix and mold are clamped together, the type metal spirted through the orifice, and the operation is complete. The type is taken away and falls into its proper place in the line, and while this is going on the next type is cast. No justification is required with this machine, as when the copy is prepared the proper spacing is indicated by the operator mechanically, less than a second being necessary for each line. In the casting of the line the proper spaces are cast with it, whether en quadrats, thick spaces, middle spaces or thin spaces, or any combination of them. No distribution is required, as when type is done with it is cast into the melting-pot. The subsidiary machine, or that which prepares the copy, is an inexpensive one, and can be operated at home or anywhere, or work on it can be executed months before the casting becomes necessary. The main machine is operated with the same regularity as a clock, type being cast three or four or any other number, up to its limit, in each second, and the same time being allowed for moving the matrix plate, the casting and the removal of the type, in one line as in another. Thus it can be employed at its maximum, while other machines, depending upon the key-board, will sometimes set five letters in a second, and at other times there will be a pause of more than a second between two letters. A speed of thirty-nine hundred ems has been shown for two hours upon this machine.

Lapped Paper.—Reams of paper sent in flat, that is, not folded, with the two ends lapped over—thus being divided into three.—*Jacobi*.

Large Cards.—A size of card used in England, 4½ by 3 inches.

Large Court Envelopes.—An envelope employed in Great Britain to take large post octavo in half, 5½ by 4¼ inches.

Large Paper.—A book printed with larger margin than common. The ordinary rule for the size of the leaf of a book is that it shall cover twice the area of the type surface. Thus, when a leaf measures 6 by 9½ inches the type should measure nearly 4 by 7 inches, and in a book 3 by 5¼ inches the type should measure nearly 2¼ by 3½. If the type page is much larger than these examples the margins are scanty, but if much smaller the space runs to waste in that book, and the volume might be called large paper. In some octavo volumes the type page only covers from one-fifth to one-third of the whole surface of the leaf. These are then always known as large paper. This term is also used in distinction to small paper. The latter is the ordinary edition. After a sheet is worked off the form is locked up in two chases with much more margin, each of these being worked separately, generally also on better paper. There are sometimes three sizes of paper, as in Johnson's Typographia, published in 1825.

Large Post.—In England, a size of writing-paper, 21 by 16½ inches.

Latin.—The language of the ancient Romans, originally perhaps spoken in no wider extent of country than the states of the Church, but destined to become the common means of communication of one hundred and twenty millions of people who were governed by Rome in the height of her power, and since that time to a great extent the common language of the world. Roman history generally dates from A. U. C., or the building of the city, 753 B. C. In the inscriptions which have come down to us the words have an older and more rustic form than in later times. When Rome began to take the place of ruler of the world the language was much enlarged and authors of importance began to be numerous, their subjects covering a wide range.

It is not probable that Latin was ever spoken by the common people with as much compression, inversion and grammatical peculiarities as we now find in the best remains. Cicero affirms that he knew only five or six ladies who spoke it correctly. It was a long time before Greek sank into a secondary place, but from Cæsar's time there could be no doubt as to what language was most useful and most generally spread. In the second century of our era the growth of the empire had become so great that the influence of the various provinces upon the language was perceptible, and with the decline of honor and of patriotism which accompanied the reigns of the later successors of Augustus and Trajan writers of eminence ceased to be produced. Medicine, law and theology occupied the attention of most of those with education, but after St. Augustine few authors deserve notice. The Church in the West took Latin as its language everywhere, and although exceptions were sometimes made for a brief period within a limited territory, yet this general employment, with the fact that knowledge was contained nowhere else than in Latin, made this tongue current long after the common people had ceased to have any knowledge of it. The rise of Italian and French began near the year 1200, although rustic Latin or modified Latin had appeared three centuries before. Until 1500, however, Latin maintained its superiority over its daughters; until 1800 lectures were given in it in all European universities, and until 1848 it was the official language of the Hungarian Parliament. Professors in some universities in Germany, Holland and the Austrian empire still teach in it, the Roman Church adheres to it in its public service, and physicians and lawyers everywhere feel obliged to have an acquaintance with its vocabulary. Its old importance as the reservoir of knowledge has passed; since 1700 or 1750 English and French have each surpassed it, and since 1800 German. After 1800 few books of high character as compilations appeared in Latin, and no one now thinks of writing in Latin except upon classical, legal or ecclesiastical matters. Colleges give it far less attention than formerly. At the same time the texts are more correct, the language is better understood, and the peculiarities of the tongue are much more easily accounted for than at any former time. Latin scholarship is most thorough at present in Germany and England. Latin has given rise to nine other tongues, three of which, French, Spanish and Italian, are of the first importance; one, Portuguese, of secondary value, and five lesser, Catalan, spoken over a third of Spain; Provençal, used in the South of France; Romansch, used in some parts of Switzerland; Roumanian and Vaudois. Together these languages are spoken over a vast extent of country, and are employed by many millions of peoples. In the New World alone Spanish and Portuguese divide between them eight millions of square miles, and those who speak these languages may reasonably expect that in course of time there will be a hundred millions of people who will understand no other language than one of these.

The letters in Latin are the same as in English. W is only found in foreign words. I and J are used in most books of the present day as separate letters, but in the newest English and German typography both are alike represented by i. For instance, by these persons jam is written iam and juvenis iuvenis. An instance of treating these two letters as if they were one occurs in the English word hallelujah, pronounced halleluia. The letter u was both vowel and consonant, and is frequently now printed as in svper, jvs or cvbo. K is little used, c being employed instead. Y and z occur only in Greek words, and in the earliest times i was used for y and ss for z. X is of late origin, cs or s having been used instead. The diphthongs æ and œ are frequently spelled out now, as Caesar instead of Cæsar. The case is laid as in English, there being, however, more q's, m's, l's and n's than in our tongue. The q can be transferred to the w box, and that to the q box.

No rule can be given for division which will be followed by all authors. As a general thing, divisions take place between consonants, and between original words and their suffixes or prefixes, as in tol-lere, dex-ter, multum, con-sultum. Capitalizing and punctuation are the same as in English, except that, as sentences are frequently very involved, it may often be found necessary to use more commas when rhetorical pauses occur. No accents are absolutely necessary in Latin, as none occur in the old authors, but a few are at present used for distinguishing apart in meaning words that otherwise might be confounded, as hic (this) from hic (yesterday). These accents are the diæresis and the circumflex. Long and short marks are used in metrical works and in criticism of them. In old Latin printed books the omission of a letter is often shown by a stroke over the preceding letter, as in dictū for dictum. Proof is read as customary, the copy-holder pronouncing every word according to its obvious English way, and spelling out all uncommon words. Much depends in regard to accuracy upon the editor.

A good Latin dictionary is indispensable in a printing-office. For ordinary use a common school dictionary is enough, but if the work runs upon the classics the last edition of Andrews's Dictionary, edited by Charlton T. Lewis, will be found very useful. All authors, however, do not spell alike, and it will sometimes be found to be the case that a word, a spelling or a use, unsanctioned by the dictionary, rests upon a solid foundation. New manuscripts are continually coming to light, and old ones appear in new editions.

Latin literature began with Livius Andronicus and Nævius. Ennius was called the father of Roman poetry. Terentius and Plautus wrote plays of high excellence. The golden age of Latin literature is usually reckoned from the death of Sylla to that of Augustus (78 B. C. to A. D. 14). Among the great authors produced by Rome were Virgil, Horace, Lucretius, Catullus, Ovid, Livy, Sallust, Tibullus, Cæsar, Cicero, Seneca, Juvenal, Martial, Tacitus and Pliny. Examples of almost every kind of writing, except the novel, were produced by them, and three of them will probably continue to influence human thought and literature until the end of time. Virgil's poetry has been imitated in every country and by every age; Cicero has formed the model for graceful critics and pleasing orators, and Horace is still read and admired by those who desire to see apt criticism, sagacious remarks, neat turns of sentence, united with admirable form and a consummate knowledge of the world. Books were written in Latin almost exclusively for the first fourteen centuries of our era, and after the modern tongues had appeared and had developed much literature many authors continued to use the learned speech of the Western Empire for some, if not all, of their productions, including Milton, Erasmus, Buchanan and Bacon. Milton's Latin poems are much esteemed.

Latin grammar is very complicated. The principal words form their various changes and denote their various relations by modifications in their endings, and the place which each is to occupy in the sentence is consequently not determined by precedent. Inversions, therefore, are very common, and it is the rule, when attention is to be called to any particular idea or word, to place that at the beginning of the sentence. There is no article; the demonstrative pronouns are used for this purpose when it becomes necessary, but that is not often. The nouns have six cases, endings carrying the force of a preposition. In consequence prepositions are not so necessary as in English. There are three kinds of gender, masculine, feminine and neuter, neither bearing any necessary relation to the sex of the person or thing described. Adjectives and pronouns are both declined and have case and number. There are six tenses to the verb and two voices. Long and careful study is necessary to acquire Latin to an extent sufficient to be useful. As a specimen of Latin is quoted part of a poem by Claude Louis Thiboust in 1754, giving an exact idea of a printing-office at that day. It should be remarked that there is, of course, no warrant in classical Latin for the use of the words which are employed in technical senses by printers, as printing did not exist in early times:

COMPOSITOR.

Jam spectare juvat quænam sint munera stantis
Compositoris; habet divisas ordine Capsæ
Quasque notas; scriptorum imitabitur ære tenorem.
Mirare hunc scite propriis sua signa legentem
E Loculis, quæ, ut mox reddant exempla, reponit
Sub Ferulam, Spatiis disjungens singula verba.
Linea non debet reliquis oblongior esse,
Haud etenim posset constringa Pagini fune.
Exspecta donec fuerit composta Tabella;
Ille ministerium peragens, in marmore levi
Imponet tabulam, disponens ordine cuncta,
Verborum ut seriem servet replicata papyrus.
Ligna locat; Cuneis illam conabitur arcte
In quadro densare iteratis ictibus; ulla
Littera non recidat, tentabit; deinde levabit.
Fit primum Specimen; corrector menda peritus
Expungit, calamo signans in margine chartæ,
Ut tenui retrahantur Acu de corpore formæ.

Translation.

Let us see now what is the duty of the compositor, who is always standing. I perceive before him cases, where all the letters are ranged in order in the boxes. He imitates by their means the rarest masterpiece of writing. I admire his learned activity, which draws from each box the letter appropriate to that which he reads in his copy. Ranged one by one within his stick, a space separates each word. He gives to all his lines an equal length, for without this attention the page could not be tied and well made-up on the galley. Wait till the matter shall be entirely set. You will see him, faithful to his art, carry it at first to a polished stone, lay it down with order and with great care, in order that the impression shall everywhere take well upon the paper. For this he places furniture and takes quoins, with which he locks up the form by redoubled blows. He raises it afterwards to see that nothing moves and no letters fall. After trying it he lifts the form. Then he takes the first proof. A skillful corrector marks the errors on the margin with his pen, and the compositor afterwards corrects them in the form by means of a bodkin, with which he raises the letters.

Laufbursche (Ger.).—The errand-boy, the devil.

Läufer (Ger.).—The brayer.

Lauge (Ger.).—Lye.

Laugenkessel (Ger.).—The lye-jar.

Lavage (Fr.).—Washing; used concerning the washing of a form.

Lavatura della Forma (Ital.).—Washing the form.

Laver (Fr.).—To wash.

Law Calf.—Calf leather which is completely uncolored, the natural color being, as described by some American humorist, that of underdone pie-crust.

Law Printing.—This is a very large portion of the printing business. Litigation is always going on, and all of the superior courts of every State, as well as those of the United States, require the briefs or law cases before them to be printed. The usual number of copies is from twenty to thirty, the price now being in New York eighty-five cents a page, of which the compositor gets fifty-four. Out of the other thirty-one cents the presswork, paper, proof-reading, make-up and all other expenses must be paid. It is consequently unremunerative. In New York city ninety-nine one-hundredths is done by eight firms, which have learned by experience how to do it quickly. Three of these houses each have twenty-five thousand pounds or over of type used for no other purpose, the size being small pica, nothing less being allowed by the courts. Larger type is sometimes used. The late William A. Beach, an eminent lawyer, used always to print his cases in pica, double leaded. The size of the page in New York is 8½ by 7 inches, and down the side are placed the folios. They are not included in the square of the page. These are kept standing, so that all that needs to be done with them is to pick them up. Two sizes of paper are used, 23 by 33 and 22 by 28, the difference in the margin being all on the outside, the head-pieces and gutters being alike. A good weight for the former is forty-eight pounds, and for the latter forty pounds to the ream. When the copy comes in from the lawyer it is cut up into short takes of about a thousand ems each, and these are emptied upon galleys in order. Within two hours after the first take has been given out the proof-readers should have a proof, and in three or three and a half hours the make-up should begin. Law pages are generally imposed four pages at a time, but sometimes in eight. The chases should be especially adapted for them. Those used in one office in New York are of cast iron, all of the furniture being cast in them, that is, the furniture at the head and centre. At the side there is only enough room for the sidestick and the quoins. These are preferably of metal. In an office which does much of this work it is desirable to have the press in the composing-room, so that no time need be lost in carrying the forms back and forth. It should be where there is a good light. The furniture around the chase on the bed being right, the edition can be printed off very quickly. One man on law work can make up and impose one hundred pages in a day, if his side folios are all set, which will enable him to keep up with twenty compositors. If a case is to be made up in a still greater hurry than this, one man divides the pages, adding slugs if they are short; a second man puts on the folios, head and side; a third ties up and puts the pages on the stone, and a fourth locks up. It would be possible, by putting on good men, working long hours, and adding help when one of these lagged behind, to make up a thousand pages in a day, but so far no American office has been required to do more than two hundred in a day on the same case. Everything must be in abundance, and there must be strict order, if large works in law are to be quickly executed. In offices in the smaller cities when a very large case comes in, say five hundred pages to be done in a week, and the resources of the establishment are unequal to it, the lawyer would undoubtedly give his consent to its being printed in two or three offices. In this case the parent office could take, say, from pages 1 to 256, inclusive; the next from 257 to 512, and the third from 513 to the end. The copy is to be divided in three equal divisions, each supposed to be about one hundred and sixty or one hundred and seventy pages, although they may run up ten or twenty pages more. Each of the three offices then proceeds with its work and completes it as if it were a separate case. When done it will collate thus: Pages 1 to 193, first office; blank, pages 194 to 256; second establishment, pages 257 to 486; blank, pages 487 to 512; third establishment, pages 513 to 690. In this way three offices can be employed on the one case, and neither need pay any attention to the others. When No. 1 ends a note should be inserted on the page that the next page after 193 is 257, and the second should have a note in a similar way that page 486 is succeeded by 513. All that will be wrong about this case will be the numbering, and neither lawyer nor judge will interfere. That could not be done in New York or Chicago, for the lawyers would not give their consent, thinking that the case should have been refused if the capabilities of the establishment were not equal to it, and this plan cannot be adopted on any other kind of work. Instances are known, however, where pages for stereotyping were thus set up on other books, and the figures at the head of the second part all changed afterwards in the plates. Notes in law cases are usually in brevier. A blank line is used in many offices between paragraphs, and when references in brevier to authorities are given in separate lines several quadrat lines follow, so that the lawyer can write in other references. There are well-known abbreviations to the authorities quoted, all that is required being to make them definite.

Law Work.—A general term for legal work of any kind.

Lay.—This refers to the position of the print on a sheet of paper.—*Jacobi* It also refers to imposition of pages.

Lay Down.—To put pages on the stone for imposition.

Lay Marks.—The marks or stops used for laying the sheet to in printing.

Lay of the Case.—The position in which the boxes used by a compositor are arranged in his cases. There is a degree of similarity in the lay of all countries which use the German or Roman characters, and this is roughly alphabetical. The earliest case known to the present writer is one of a little before 1700. Wolffger shows how the Roman case was laid in Germany at that time. Only the centre of the case is shown herewith, it being gigantic, with every character in one case. At the bottom of the case, and nearest the hand, were the boxes as shown in the diagram above.

ſ	s	t	u	r	v	x	y	z
h	l	m	i	n	o	p	q	
b	c	a	Spaces.	e	d	g	ff f	
ct		&	'	. -	:	?	(j	

EARLY GERMAN LAY OF THE ROMAN CASE.

A	B	C	D	E	F	G	â	ê	î	ô	û	♂	△
H	I	K	L	M	N	O	ä	ë	ï	ö	ü	*	℈
P	Q	R	S	T	V	W	á	é	í	ó	ú	□	
X	Y	Z	Æ	J	U		à	è	ì	ò	ù	Ω	†
♄	♃	♂	☉	♀	☿	☽	♈	♉	♊	♋	♌	♍	*
1	2	3	4	5	6	7	♎	♏	♐	♑	♒	♓	
8	9	0			ſt	k	ſſi	ffi	ſſl	ffl	℞	ꝺ	§

MOXON'S UPPER CASE.

j			æ œ		s					ſl	fl
' &	b	c	d	e	i	ſ	f	g	ſh	ſſ ſi	ff fi
ct ;	l	m	n	h	o	y	p	q	w	En	? Em
z x	v	u	t	Spaces.	a	r		, .	: -	Quadrats.	

MOXON'S LOWER CASE.

It will be seen that a b c are together, as are d and e; g ends the lower row and h begins the next; then come l m n o p q, with the interposition of i; then s t u v x y z, r being in the centre. The alphabet begins in the lower row, and then ascends to the next one, and after that to the third. The earliest English case is that shown by Moxon in 1683.

This is substantially the lower case of to-day in England, where the figures are in the upper case, but of course with some modifications. There is no exclamation mark; the semicolon is now transposed, the comma thus being forced where Moxon has w, and that taking the place of q. This last letter pushes up x and takes its place at the corner, and that removes z to where the semicolon was. The long s with its combinations must have been provided with places, but when it ceased to be used, about 1800, a number of extra boxes were available and s itself took the space formerly given to long s and to f. Sh was dropped, allowing f and g to move along one box farther. It is probable that the spaces were mixed, no separation being made between the thin and the thick. The rude alphabetical arrangement is to be noted in this as in the German case. The upper row begins b c d e f g, i being interpolated; the next has l m n o p q, h and y being inserted, and the last row v and u. Sorts not shown are ç fb fk Œ ‡ ‖ ¶ [and), nor are there any small capitals.

A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	W	P	Q	R	S	T	V	W
X	Y	Z	Æ	Œ	J	U	X	Y	Z	Æ	Œ	J	U
ä	ë	ï	ö	ü			â	ê	î	ô	û	§	‡
1	2	3	4	5	6	7	à	è	ì	ò	ù	‖	†
8	9	0	£	ç	Hair Spaces	k	á	é	í	ó	ú	¶	*

ENGLISH UPPER CASE OF TO-DAY.

&	]	æ œ	' j		Thin Spaces	)	?	!	;		fl
	b	c	d	e	i	s		f	g		ff fi
ffi ffl	l	m	n	h	o	y	p	,	w	En	Em
z x	v	u	t	Spaces.	a	r		q .	: -	Quadrats.	

ENGLISH LOWER CASE OF TO-DAY.

Smith gives three diagrams of cases. In these the capitals are at the top and left of the upper case, the figures next below, and the long s in combination with other letters following. At the bottom were the diæresis vowels. Small capitals were at the top of the other side, and accented letters and reference marks below them. In the lower case, beginning at the left-hand upper corner and going down, the letters were ct, &, ffl, j, hair space, z and x. Brackets, parentheses and exclamation points were introduced. In his other cases the transpositions were of the minor letters. The common arrangement in British printing-offices of our day varies widely from that used in the United States. It has been modified by the newspaper compositors, whose influence has also extended into many book offices, but the above is still the general method in which cases are laid in England.

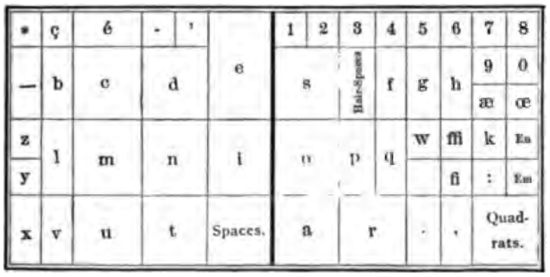
In France the case was developed much as in England. That illustrated was used under the First Consul. Where h is with us i is shown, and s is one box nearer to the hand. Both of these would be improvements in English. Larger boxes are required for x and q.

We have no diagram of the American case earlier than that given by Van Winkle in 1818. It is substantially that of Sherman in 1836, and Adams of the same date. No provision was made for a galley on the ledge between the cases. The present lay of the American case differs from that laid down by Adams in having the capitals at the right hand in the upper case and in some other minor modifications. Nowhere in the United States are cases laid with the less used sorts next to the bottom of the upper case, as they are in England, and in no American lay are the figures out of the lower case. The approved custom in offices in this country comes very close to the diagram shown, each establishment making modifications in some minor respects.

Reforms in the lay of the case have frequently been suggested. Besides that of Lord Stanhope, several new ones have been tried, among others that of Henry R. Boss of Chicago. The main reasons lately assigned have been that many of the most used letters are not close to the hand, and that the less used usurp their places. Another point is that some boxes are excessive in size. This is true of v, u, m, c, d and r, and to a less extent with h and s. A third reason is that, both in composition and distribution, the thin spaces and en quadrats are separated from the thick space, whereas they all should be together, thus facilitating the work very much. No one denies any of these assumptions, but no case has yet been produced which attempts remodeling and at the same time takes the fancy of the trade. The most compact way of arranging the principal letters would be as shown in the next column, letters being transposed according to their frequency, thin letters coming nearer the hand than thick, and space being economized wherever possible. Around these could be arranged the other sorts. The whole area of the two cases is equal to two hundred and twenty-four lower-case small boxes; in the centre of the lower case shown herewith, covering sixty small boxes, or about three-tenths of all, are found more than three-quarters of all the characters used. It will surprise many printers to know that the thin spaces and en quadrats are as numerous as a, o, i and t together. In the case used at present in America y and p, which have thirty-seven letters where s has eighty, are nearer to the hand; h, which has sixty-four letters where i has eighty, is also nearer; and u, which has thirty-four letters, is closer than l, with forty, or d, with forty-four. Thin letters should be nearest to the compositor, as the nick is small and cannot be seen so easily.

A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	X	P	Q	R	S	T	V	X
â	ê	î	ô	û	Y	Z	J	U	É	È	Ê	Y	Z
É	È	Ê	Æ	Œ	;	W	ffl	Æ	Œ	W	Ç		!
à	è	ì	ò	ù	)	Ç	fl	§	]	†			?
«	°	U	J	j	ᵉ	ʳ	ff	ë	ï	ü			

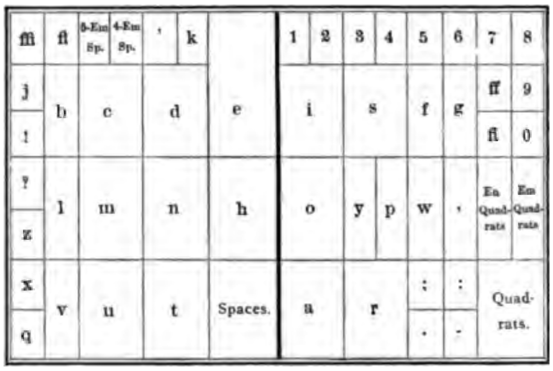
FRENCH UPPER CASE OF THE EIGHTEENTH CENTURY.



FRENCH LOWER CASE OF THE EIGHTEENTH CENTURY.

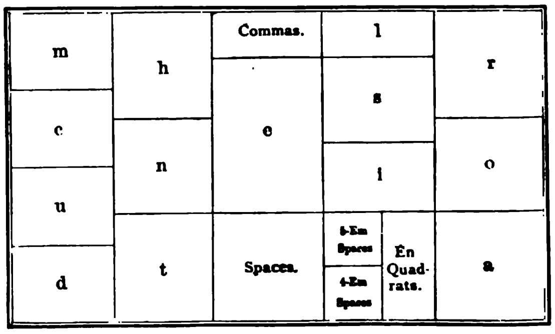
*	†	‡	§	‖	¶	☞	$	£	℔	℞	@	⅓	⅔
%	℀	'	°				⅛	⅜	⅝	⅞	¼	½	¾
Æ	Œ	Æ	Œ	æ	œ	&	—	-	——	⌐	^	¬	~^~
A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	W	P	Q	R	S	T	V	W
X	Y	Z	J	U	]	)	X	Y	Z	J	U	Hair Space	ffl

AMERICAN UPPER CASE.



AMERICAN LOWER CASE.

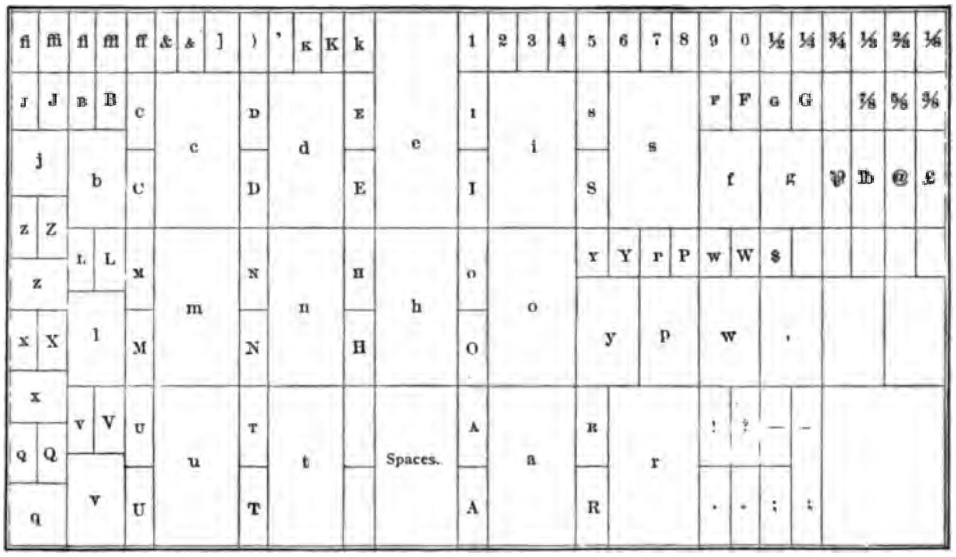
In much work there must be extra boxes, and in some larger boxes must be contrived. These extra boxes can usually be placed in the upper case by removing a few reference marks, or in the lower case by trenching upon the space generally allotted to c, u, m and n. In music cases many boxes are divided. When a sort is to be much used it is better to take the place allotted to x or z, for example, and there deposit the new character. The x can be transposed to the upper case.



CENTRE OF THE LOWER CASE, REARRANGED FOR SPEED.

A complete change was made in the case in 1859 by Thomas N. Rooker of New York. He enlarged the lower case somewhat, so as to bring down the capitals and small capitals and other most used upper-case sorts, and placed them above or alongside of the small letters. This case was used successfully for several years in the office of the New York Tribune. Those who were employed upon them thought that they were advantageous. On one of them Andrew J. Isham set in one week ninety-six thousand ems.

Whatever lay of the case is adopted in any office should be adhered to by all workmen. To have one case laid in one way and another in a second way is to invite disorder. Compositors change and cases pass from one man to another. It is well to have printed diagrams of large size in some conspicuous locations in each printing-office, these diagrams to be the guides for the workmen, from which they shall not be allowed to vary.


fi ffi fl ffl ff & &]) ' K K k 1 2 3 4 5 6 7 8 9 0 ½ ¼ ¾ ⅛ ⅜ ⅝
J J B B C D E I S F F G G ⅞ ⅝ ⅞
j b c d e i s
C D E I S f g ℔ @ £
z Z L L M N H O Y Y P P W W $
z m n h o
x X l M N H O y p w ,
x
v V U T A R ! ? — –
Q Q u t Spaces. a r
q v U T A R . . ; :

ROOKER'S COMBINED CASE.

Lay On.—To feed or lay on the sheets one by one in printing.

Lay On a Form.—To put a form on the press or machine for printing.

Lay On the Press.—An instruction to put a form on the press preparatory to printing.

Lay Type.—To put a new font of type into cases.

Layer-On.—The feeder on a printing-machine. This expression is used in England.

Laying Cases.—Filling cases from a font of new type.

Laying Letter.—The putting of new type into cases.

Laying-On Board.—The board on which the white paper is laid, and from which it is fed sheet by sheet.

Laying Pages.—Placing pages on the stone in a proper manner for imposition. This should be very thoroughly learned, and the common test applied of seeing whether the number of the two pages together does not exceed that of the total number of the pages in the form by one. For instance, in a sixteen-page form the 1 and the 16 go together, the 8 and 9, the 4 and 13. In each case they make one more than the number of pages in the form. No pages should be untied before it is known that they are in their proper places.

Laying-Up Board.—The wooden board on which forms are laid up for distribution; the letter-board.

Le Bé, Guillaume, a celebrated Paris type-founder and engraver. His father supplied Robert Stephens with paper, and the young man was brought up in the household of that great printer. He went to Venice in 1545, subsequently returning to Paris, and practiced his art with distinguished success until his death in 1599.

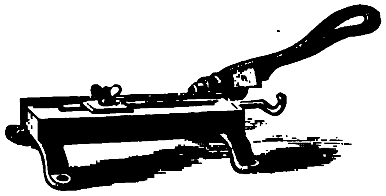
Le Gascon, a celebrated binder in the reign of Louis XIII. of France, much distinguished for the beauty of his gilding and his use of dotted tools.

Lead.—One of the commonest and cheapest of metals, which, in combination with antimony alone, or with copper or tin or both added, forms the basis of type metal. It has a gray-blue color, with a bright metallic lustre when newly cut, but it soon becomes tarnished and earthy-looking in the air. Its texture is close, or without perceptible cleavage or appearance of structure. The specific gravity of common lead is 11.352, but of pure lead from 11.38 to 11.44. It is very malleable and ductile, but is soft and destitute of elasticity, and fuses at 612 degrees by one authority, but 634 by another. Its compounds with tin and bismuth melt at a much lower temperature.

Lead-Box.—The receptacle for broken or small pieces of leads.

Lead-Cases.—In England, cases of similar dimensions to others, so that they can be stored away in the ordinary racks. They are filled with leads.

Lead-Cutter.—A machine for cutting leads. It is of iron, with a gauge which can be fixed at any desired place. The lead is put against this, and the blade is



LEAD-CUTTER.

drawn down, cutting it off squarely and neatly. The knife nearly always acts upon the principle of a shears. Several varieties are known, and the larger and more powerful will also cut brass rule.

Lead-Galleys.—Large sloping trays with bars running across them to separate the sizes. The phrase is English.

Lead-Molds.—The apparatus for casting leads in lengths, which are afterwards cut to sizes. Much practice is necessary in order to enable good results to follow. The following directions for casting are taken from Southward's Practical Printing. They will prove useful in offices at great distances from type-foundries, but those nearer at hand will find it cheaper and more convenient to buy their leads:

"A complete set of apparatus consists of the following: A small furnace, a melting-pot, a set of ladles, a small marble slab, a lead-mold with shifting screws, a lead-scraper, straightedge and trying-tool or gauge. A packet of rouge and about a pound of Spanish brown ochre will also be required. The mold should have shifting-screws, permitting of its being altered to make a lead of any degree of thickness up to pica. It must first of all be cleansed free from grease which may have accumulated on it in the process of manufacture. This is done by making it thoroughly hot by pouring molten metal into it for ten or fifteen minutes. Then dip a clear sponge into hot water and slightly squeeze it into the mold until the hissing noise ceases. This must be continued until a coating of fur forms over the face of the mold, similar to that on the inside of a tea-kettle. This fur must not be wiped off, but a solution of thin rouge or ochre and water must be run down the mold while it is hot. The heat of the metal and size of the ladle must be regulated by the thickness and length of the lead to be cast. Care should also be taken in gripping the mold in the centre. In the case of casting very thin leads, or if the mold is in any way defective, the following plan may be resorted to: Smoke the inside of the mold by holding it over a gaslight or candle so as to produce a coating of lampblack; but the process above described is the surest. The small marble or iron slab is necessary to drop the leads upon as they are delivered from the mold—this is to prevent the leads from twisting while they are hot. Having prepared everything as directed, proceed to set the mold. We suppose that four-to-pica leads are about to be cast. Take two nonpareil en quadrats, place one at the top and the other at the bottom of the mold and gently put the screws down onto them. After well heating the mold cast four leads and clean off the edges with the scraper; then with an ordinary lead-cutter nip off the ragged ends. This being done, lay the four leads on the top of one another on a small flat surface—a piece of planed iron would be preferable—place four pica quadrats, one on each side, at each end of the leads, and holding them up to the light lay the straightedge across the leads and quadrats so as to tell whether they are true to gauge. If they are all right go on casting, but if there is the slightest defect it must be remedied, as the leads will not be true and therefore useless. It will be as well to gauge the leads occasionally to test whether they are true. Be careful in testing the leads to notice which is the top and which is the bottom of the leads as they are delivered, for if they are not all laid the same way it is impossible to detect where the error lies. The safest way is to mark each of the four leads as they are delivered from the mold, as after the edges are cut off and they are dressed it would be difficult to tell the top from the bottom. The solution of rouge and water must be frequently applied, as it keeps the mold free from grease or grit of any kind. Be careful not to touch the inside of the mold with the fingers or anything which would be likely to leave a deposit of grease."

Lead Out.—To white or spread out by means of leads.

Lead-Racks.—Receptacles for holding assorted leads.

Leaded Matter.—Type with leads between the lines, in contradistinction to solid matter.

Leader Press.—A job press made at Palmyra, N. Y., with solid platen and eccentric adjustment. The bed is vertical.

Leaders.—1. Dots or hyphens placed at intervals upon bodies of different thicknesses to guide the eye across the line. En, em, two em and three em are the usual widths. Spaces should be placed before leaders when the line requires justifying, and not scattered between them. They are sometimes set off from the figure farthest out to the distance of an en or em, but this is rarely done on newspapers, legislative documents and reports of societies where space is an object. 2. The editorial articles of a paper.

Leading Article.—The article expressing the opinions of the editor upon some of the chief topics of the day, in distinction to the other editorial articles and the news matter of a journal. It is now rarely employed in this sense in America. All of the articles printed in large type next to the editorial head are spoken of as editorials or leaders.

Leads.—Thin pieces of metal placed between lines of type to cause the page to present a more open appearance. They are of type metal usually, but type metal with a much larger proportion of lead than common. They are also made of brass, in this form being used very little except on newspaper work. In foreign countries zinc and tin have been and are now somewhat employed. Vulcanite has been used. Formerly tin, or iron coated with tin, as in culinary vessels, and iron were used for this purpose, being cut up by shears into strips of the right height and length. These strips were known as scale-board. They were made in fewer lengths than at present, and by the pound were as costly as type. It consequently was the custom when the supply of scale-board for a given width of page ran short to use a longer size and indent each line an em or more. For this the compositor received no pay, and this was one of the first grievances which the compositors in London called to the attention of the masters when a revision of the scale was made one hundred years ago.

The length of leads is, usually speaking, from six ems of pica to thirty-eight. Longer and shorter ones are made, but very short leads are apt to be confounded either with hair spaces of large metal types or mixed with the broken leads. For the sizes larger than twelve ems they are usually provided in quantities, twelve, twelve and a half, thirteen and thirteen and a half being newspaper sizes. Twenty-four and twenty-two ems are octavo; twenty-one, twenty and nineteen ems duodecimo, and seventeen ems eighteenmo. The most common sizes in bookwork are twenty-two, nineteen and fifteen ems; in job-work fifty, forty-two, thirty-eight, thirty-six, twenty-two and nineteen. In book offices the subdivisions are very close between one size and the next, and it may happen that such an office will have fifty widths of leads. In job-work leads of all lengths are requisite, but as the very wide measures are rare the leads are usually made by piecing together two or three short ones. Labor-saving leads are known, each piece having its size stamped on its side.

Most leads are made six to pica, but many daily newspapers are employing seven or eight to pica. These thicknesses are occasionally used in book offices. The thinner leads, nine, ten, twelve and fourteen to pica, are only found in book and job offices, and are not common. The last can scarcely be told on the printed page. Five, four and three to pica are only employed by book and job men. Newspapers may be widely leaded, but it is by putting two ordinary leads together. If leads are any thicker than three to pica they are known as slugs in America and clumps in Great Britain.

Leaded matter requires more liberal spacing than solid matter. In single-leaded matter the lines are nearly always spaced out, while on solid matter much is taken in, some offices requiring this to be done wherever possible. Double-leaded matter is almost always spaced out, most offices permitting the spacing to reach an em when required. Leads should not be omitted in the centre of a paragraph where the remainder is leaded, even if two lines come together, the upper having very few descenders and the lower very few ascenders. When a whole paragraph or column of similar matter cannot be leaded the solid part is the last and never the first, and if the matter is double leaded and needs reduction one lead should be extracted from between each line at the lower portion. The first part cannot be double leaded and the last made solid. Leads are very spongy, and should never be used together, even if abundant, to fill out blank pages or other similar spaces. This should be done with larger pieces of metal. Sometimes pages of type will seem unequal in length, although having the same number of lines and the same number of leads. This may be occasioned by leads of different thickness, but if these are right the difficulty is caused by dirt. Take the leads out of the larger page and scrape them. Type-founders and printers' supply men often furnish leads without taking much pains; burrs are frequently found upon their ends and they are also short and long. They should be carefully examined before being used.

Special leads are made for special work. In electrotyping and stereotyping leads are high, that the wax in the former and the plaster in the latter may not descend too low. Flexible leads are made for use in job-rooms. They are of tin and lead, and can be bent into any shape without breaking, thus giving great facility in the construction of curved lines. Brass leads have been spoken of. These have never been used to any extent in book and job work. In England they are known as space-lines, which was once a common name for all kinds of leads. Leads appear to have been employed soon after the beginning of printing. In the Offices of Cicero, published by Fust and Schoeffer in 1465, slugs of about the tenth of an inch or brevier in thickness were employed. These may, of course, have been strips of wood. But leads properly so called were soon used. Their employment is now constant, but is greater in the United States than anywhere else. In Germany, France and England the majority of books are solid. In this country they are leaded. A very much larger proportion of job-work also is here executed, and that requires many leads. Leads were worth in England in the year 1808 three shillings a pound for six to pica, or the same price as bourgeois type and all above. Eight-to-pica leads were worth four shillings, and four to pica one shilling and tenpence. In White's Specimen-Book, issued in New York in 1833, six-to-pica leads were listed at thirty cents a pound; in Bruce's of 1848 twenty-five cents, and in Conner's of 1891 sixteen cents. Prices have fallen in England likewise.

The quantity of leads necessary in an office varies considerably. It should be enough to lead all the matter standing at one time which requires to be leaded. On a daily newspaper this may not be more than four or five pages, but it may rise to ten or twenty pages, according to the custom of the office in regard to killing matter. On bookwork no estimate can be made except as drawn from experience. One book may be in long primer twenty-one ems pica wide and double leaded; enough must be provided for the whole amount of type likely to be up at once. At the same time leads must be on hand for measures twenty, twenty-two and twenty-four ems wide. It is therefore not an excessive estimate to have a pound of leads against each pound of type in a book or job office. It does not pay to unlead matter when a job is worked off; a better policy is to have enough leads to use until the matter is naturally distributed. In ordinary offices only one thickness, six to pica, is desirable; in larger offices not doing publishers' work a few eight to pica and five to pica may be required, but in offices making a specialty of publishers' work all sizes from five to pica to ten to pica are required. Even in such an establishment it is possible to have the bulk of all the work done in sixes. High leads should not be allowed in letter-press work, nor should low leads be used when the remainder of the leads are high. Leads are likely to work up in printing. It is therefore desirable for the pressman to keep his eyes open for this accident, which may happen at any moment. Bottle-arsed type, or type larger at the bottom than at the top, is rectified by cutting leads in two in the direction of their length, and after the form is made up one or two of these leads can be put into each page, or three or four into each column of a newspaper. The matter should be planed down, locked up with the fingers, a blow or two given at the side and bottom on the quoins, and the leads then forced in below the surface of the type, but not far enough to go to the bottom. A drawer or box for broken leads should be in every office. These pieces are often very convenient.

The weight of leads may easily be calculated. In six to pica it takes 850 ems to make a pound, in four to pica 575, and in eight to pica 1,150. Thus in the six to pica seventeen leads 50 ems long will make a pound, or fifty leads 17 ems long. A slug 140 ems long and pica thickness will also weigh a pound. Thus an easy calculation can be made as to the quantity which will be necessary in any job. Suppose a book is to be set in a measure 17 ems long with six-to-pica leads. One hundred pages are to be got up at once, and there are to be thirty lines to the page. There will therefore be required three thousand leads. By the rule just given fifty leads go to the pound, and this figure divided into three thousand gives sixty pounds as the amount required. The sizes below are the commoner ones, as well as the ones most easy to make calculations with, for the size six to pica:

Length of Lead.	Number of Leads to the Pound.	Length of Lead.	Number of Leads to the Pound.
4	212	17	50
5	168	19	44
5	140	20	42
7	120	21	40
8	106	24	35
9	93	26	32
10	84	27	31
12	71	30	28
13	64	36	23
15	57	38	22
16	53		

To lead out ten thousand ems of solid matter will require in pearl 12 pounds of leads; in agate 10¼, in nonpareil 9¾, in minion 8½, in brevier 8, in bourgeois 7, in long primer 6, in small pica 5½, and in pica 4¾. A thousand ems of pearl will require in leaded matter one-third of a pound of leads; in nonpareil half a pound, in brevier two-thirds of a pound; in long primer three-quarters of a pound and in pica a pound. One pound of leads or slugs covers four square inches. In making calculations allowances should be considered for chapter headings and endings and the like.

Leads are cast in molds. The height of the lead is that of a space. Formerly printers received leads in the lengths as cast, and were required to cut them themselves. As they used shears, improved machinery not being known, the leads were frequently very imperfect. At present they are supplied in all lengths. Shaved leads are those which have been planed after being cast, and are much more even and accurate than the common kind. Printers occasionally cast their own leads. To do this well requires considerable experience. A description is given under LEAD-MOLDS.

Leads are contained in boxes, drawers and pigeonholes, and on trays, galleys and cases. The three latter are substantially the same. In the cases the boxes of the lower case are made of different widths, so as to accommodate different sizes of leads. The trays are movable articles, also divided for convenience, and the galley is the top of a cabinet, rack or desk, arranged in compartments. Pigeon-holes are more used than any other receptacles. A series of them is made of stout wood as high as a man, and three, four or five feet high. The front of these pigeon-holes is on the same line, but the depth varies. One box, the deepest, has leads forty-eight ems long, and therefore requires to be eight inches deep. Another compartment is for leads thirty-six ems long, and therefore six inches deep. To insure that leads shall not be misplaced, a block of wood two inches thick is placed at the back of the box. When the leads are pushed in they touch this block and also come out to the front. A lead eighteen ems long would require a five-inch block back of it, and a twenty-four-em lead a four-inch block. This is the main point. A lead which is too long to go into a certain compartment would therefore project, and one too short would sink in, thus disclosing its erroneous position at once. Lead-drawers have the advantage of being closed when not in use and keeping out dirt.

A distinction is made in many printers' scales between solid and leaded matter, and this distinction appears to be just, as leaded matter can be composed much more readily than solid matter. The difference in New York is three cents on a thousand, or 8 per cent. on an average. Leaded matter at the lower rate, however, is more profitable than solid, as a workman can set from one hundred and fifty to two hundred ems more in an hour.

Leaf.—The part of a sheet of a paper which is made by the last fold. It usually has upon it two pages of printing, one at the front, an odd page, and one at the back, an even page. Many old books are only numbered by the leaf.

Leaflets.—Jobs printed on a succession of leaves, either on one or both sides. They fold up in a different manner from a book and more like the folding of a fan. See IMPOSITION.

Lean.—Unproductive work; matter with few quadrats and without leads.

Lean Face.—A thin or meagre faced font of letter, the reverse of fat face. The larger sizes of type are usually thought to be lean if they fall as low as twelve and a half ems to the alphabet, and the smaller ones to thirteen or thirteen and a half. The width of type has greatly increased in late years.

Leather.—The hide or skin of an animal preserved from decay by tanning. Originally all books, with few exceptions, were bound in leather, the sides, however, frequently being of wood upon which leather might or might not be placed. After folios and quartos became less common than the smaller sizes leather was employed in almost every case, the stiffening for the covers being given by pieces of pasteboard or sheets of paper. In the early part of this century cloth began to take the place of leather, and after 1830 it became common. At the present time few books are bound in leather compared with the number bound in cloth, and the production of books is now so great that it would be impossible to find enough leather to bind them in were some calamity to deprive us of cloth.

The skin or hide, in making leather, is scraped to remove any particles of flesh which may adhere, and the hairs are also removed by soaking, fermentation, covering with an alkaline solution or otherwise. When this is done the hide is steeped in a solution of tannin, which for heavy leathers is usually derived from oak or hemlock bark, but which is to be found in many vegetable substances. Tannin acts upon the gelatine of the skins, of which they almost wholly consist, and in time changes them into the leather of commerce. This operation takes several months when not hastened by chemicals and the hide is of considerable thickness. Many kinds are scraped down considerably before being tanned. Tawed leather is made by the use of alum. Chamois leather is formed by forcing grease into the pores of the skin. After the hide has been converted into leather, during which time it has had considerable handling, it is curried, by which the requisite smoothness, lustre, color and suppleness are imparted to adapt it to the various usages of the arts.

The hides of game animals are not used in bookbinding, as they are too costly, and neither are those of oxen, horses or other large animals, as they are too stiff. Most bookbinding leathers are from sheep, goats, kids, calves and hogs. The skins of the latter were much employed at one time, but have now become uncommon. The different kinds of leather used for binding books may be classed as morocco, calf, sheep and roan and Russia. Morocco is made from goat-skins which are obtained in Norway, Germany, Switzerland and the Cape of Good Hope, and are imported dry, being tanned after arrival, unless the whole operation is completed in Europe. They are tanned in sumach and dyed in any color which may be desired, having previously been inserted in a solution of sulphuric acid. This leather lends itself to several grains, which are known as hard grain, Turkey or cross grain, and straight grain. A very beautiful grain is the Levant. The grain is sometimes given by pressure between rollers, on one of which a pattern is impressed. Imitation moroccos are sheep-skins dyed and stamped with designs by machinery.

Many sheep-skins are split, being known as skivers. The faces on them are of two different qualities. The grain side is tanned as a skiver and the flesh side is known as a chamois leather. They are used largely for small and cheap Bibles and cheap account-books. Roans are made from sheep-skins tanned and prepared in imitation of morocco. Basils are also from sheep-skins, and are usually dyed of a deep red color. They may be had either glazed or diced. Russia leather is made from the hides of young or small oxen, not calves, in Russia. The peculiar and well-known scent is derived from an oil distilled from the birch tree, the secret of which was, until the last few years, known only to a few leather manufacturers in that country. The skins are split or shaved down for bindings, the thickness of the hides depending very much upon the class of work for which they are intended. For large or heavy blank-books the skins are left of nearly the whole thickness.

Calf-skin is regarded as one of the finest leathers. It is naturally smooth, and is given a polish by rubbing with an agate or other smooth substance. Sometimes it is grained, but this is done artificially. Rough calf is used for ledgers and other larger blank-books. Law calf is the leather in its natural color. Vellum and parchment are both used for blank-books, vellum being the finer.

Leatherette.—An imitation of leather, usually made of embossed paper.

Leatheroid.—An imitation leather made of cloth or paper.

Lector (Sp.).—Copy-holder.

Lectura (Sp.).—Proof-reading.

Lectura Chica (Sp.).—Small pica, or eleven points.

Lectura Gorda (Sp.).—Pica, or twelve points; also called Cicero.

Lederband (Ger.).—Leather binding, which may be of sheep-skin, goat-skin or other material. Roan or sheep is often called calf in describing old books.

Ledger.—A large blank-book; the book in which all of the operations of a commercial firm are finally condensed. Ledgers are usually of large size and very firmly made.

Ledger Paper.—That kind of flat paper used in the manufacture of ledgers. It is usually of heavier weight and stronger texture than other papers.

Left-Hand Pages.—Those pages which fall on the left-hand side of a book and have even folios.

Legado (Sp.).—Connecting stroke in script letters.

Legal Work.—The general term for law work of any kind.

Legare (Ital.).—Tying up a page.

Legno (Ital., wood).—The furniture and quoins made of wood.

Lehrbursche (Ger.).—The apprentice.

Lehrling (Ger.).—Apprentice.

Lehrzeit (Ger.).—Apprenticeship.

Leiche (Ger.).—Literally, a corpse. Words omitted in setting; an out.

Leimtypes.—In 1887 Husnik of Prague invented a process for preparing high-relief plates of gelatine to be used for typographic printing in an ordinary printing-press, either for the reproduction of pictures or letter-press. The process is conducted as follows: A thick plate of chromatized gelatine is exposed under a negative as usual. This is then attached by means of gutta-percha to zinc or wood, thus making a firm but somewhat elastic foundation for the printing surface. The surface is next developed by treatment with a solvent, such as a saturated solution of an alkaline bichromate. This not only dissolves the gelatine upon which the light did not fall, but it also deepens and strengthens the relief. The development is stopped before any of the finest lines or dots are injured. The plate is then dried and the lights are covered with a solution of opaque printer's ink, by means of a camel's-hair brush. The plate is then exposed for a second time to the action of light, by which it is hardened and strengthened, not only on the surface, but also on the flanks of each line and dot. The black is then removed and the solvent is again applied to deepen the whites. These plates may be used directly in the press, and will print 100,000 copies. By making wax molds from these plates they may be reproduced in copper by electrotyping.

Leinwand (Ger.).—Linen or other cloth, used in the covering of books.

Leipsic.—A city in Saxony which is the centre of the German book trade, and remarkable for the magnitude of its printing and publishing operations. There are in Leipsic 120 letter-press and lithographic offices, which give occupation to 8,073 persons. This is more than are thus employed in any American city except New York. There are 10 rotary presses, 63 double and 628 single printing-machines, 194 of which are lithographic; 33 two-color machines, 117 treadle-presses, 532 hand-presses, lithographic included, and 846 auxiliary machines for glazing, paper-cutting, &c. More than thirteen hundred millions of sheets are printed annually in this town. There are 34 bookbinding establishments, with 1,544 hands and 1,320 different machines. In Leipsic there is a large central hall owned by the book trade and known as the Booksellers' House. It was built on ground presented by the city of Leipsic, the corner-stone being laid on June 19, 1886, and the building being opened to the public on April 29, 1888. It is large and highly ornamental. In this there is a clearing-house for book orders.

Leonard, Charles E., president of the Chicago Typothetæ, was born in Buffalo, N. Y., on October 5, 1829. He removed to Wisconsin in 1840. In 1845 he began learning printing in the office of the Detroit Advertiser. Three years after he returned to Buffalo and graduated from the office of Jewett, Thomas & Co. He was married in 1852 and returned to Detroit, taking the superintendence of the Detroit Daily Advertiser book and job department. He removed to Clinton, Ia., in 1856, there beginning the publication of the Clinton Herald, now a daily of much importance. In 1863 he sold the Herald and moved the job and book plant to Chicago, where, under the firm-name of Horton & Leonard, Knight & Leonard, and now Knight, Leonard & Co., he has been in a continuously successful business, the work turned out being of excellent quality. He has been a delegate to the various conventions of the United Typothetæ, and in 1891 succeeded C. H. Blakely as president of the local organization.

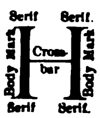
CHARLES E. LEONARD.

Lessive (Fr.).—Lye.

Lestrange, Roger, a censor of the press at the time of Charles II. Lestrange had long been devoted to the royal cause, and after the Restoration was given this place as a reward. He was disposed to be very thorough, and in a paper prepared by him while in office he states the measures which should be adopted to curb the licentiousness of the press. "The instruments," he says, "of setting the work afoot are these, the adviser, author, compiler, writer, corrector, and the persons for whom and by whom; that is to say, the stationer (commonly) and the printer. To which may be added the letter-founders and the smiths and joyners that work upon presses. The usual agents for publishing are the printers themselves, stitchers, binders, stationers, hawkers, mercury-women, peddlers, ballad-singers, posts, carriers, hackney coachmen, boatmen and mariners. Other instruments may be likewise employed, against whom a general provision shall be sufficient." He then goes on to show that discoveries may be obtained partly upon a penalty for refusing to discover, and partly by a reward to the discoverer. Both should be considerable and certain. If any unlawful book shall be found, let the person in whose possession it shall be discovered be reported and punished as the author, unless he produces the person from whom he received it. The great evil was the multiplicity of presses, which might be remedied by lessening their number. This being resolved upon, as well as the printers, let the number of the journeymen, apprentices, master founders, their journeymen and apprentices, be also determined and lessened. Joiners, carpenters nor smiths might not work upon new presses without special allowance. The whole trade was to be questioned as to the presses they knew about, the new type which had been furnished, and the construction and repair of presses. Card-makers, leather-gilders, flock-workers and quoif-drawers are to be forbidden the use of presses like those of printers, unless they also are to come within the censorship. No printing-house to be let nor press erected without notice. Type and materials not to be bought without notice. No master printer to keep a press excepting in his own dwelling-house, and no printing-house to be permitted with a back door to it. An imprint in all cases to be used. "What," he says, "shall the people do for a livelihood if the sixty presses are reduced to twenty? As many," he replies, "may be given employment as there is honest work for." A sufferance of more is only a toleration of the rest to print sedition. Something, however, may be thought of for their relief. It would not be proper to put the stationers in charge of the press, nor the printers, because their interests are against those of the crown and of good government. The number of master printers then (1663) was computed to be about sixty, whereas twenty or twenty-four would dispatch all the honest work of the nation. They had over one hundred apprentices and at least one hundred and fifty journeymen. For bad or seditious books he recommends punishment in proportion to the malice and influence of the offense. The ordinary penalties were death, mutilation, imprisonment, banishment, corporal pains, disgrace and pecuniary mulcts. These are further discriminated into the pillory, the stocks, whipping, carting, stigmatizing, disablement to bear office or testimony, public recantation, standing under the gallows with a rope about the neck at a public execution, disfranchisement (if freemen), cashiering (if soldiers), degrading (if persons of condition), wearing some badge of infamy or condemnation to work either in mines, plantations or houses of correction. Under the head of pecuniary mulcts are comprehended forfeitures, confiscations, loss of any beneficial office or employment and incapacity to hold or enjoy any; and finally, all damages accruing and imposed as a punishment for some offense. The offenses under which these persons might be convicted were blasphemy, heresy, schism, treason, sedition, scandal or contempt of authority. For the authors, nothing which stands with humanity and conscience could be too severe. "1. 'Tis the way to cut off the fountain of our troubles. 2. There are not many of them in an age, and so the less work to do."

Let-in Notes.—Another term for cut-in notes, or those let into the text, as distinct from side-notes.

Letter.—1. A character, a mark used in printing or writing. There are twenty-six letters in English, sixteen in Irish, thirty-five in Russian and thirty-eight in Armenian. In English there are three forms of the alphabet, capitals, small capitals and lower case in Roman and the same in Italic. There are besides the punctuation marks, the figures, the reference marks and the accented letters. Special letters are required for mathematical and chemical work, for the reproduction of characters in old records, and for many other special purposes. Each of these marks is known by typographers as a letter. When used in their calling they are always on rectangular bodies, larger than the face, although it may only be slightly. In the Roman character all letters consist of a combination of straight lines and curves. A certain number of letters do not enter either the lower portion of the body or the upper portion. These are a, c, e, m, n, o, r, s, u, v, w, x, z. Other letters rise to the top, but do not fall below the lower line of the letters just given. These are the capitals and b, d, f, h, i, k, l, t. Still others go below the line, and do not ascend above the top of those first shown. They are descending letters, and comprise g, p, q, y. One letter is both ascending and descending, j. A letter is said to line when a line drawn across the bottom of the non-descending characters touches every one at exactly the same height, and where similar lines can be drawn over the top of the same letters, the top of the ascending letters, and under the bottom of the descending letters. In order to be legible the top of the ascending letters and the bottom of the descending letters have a little space to separate them from the lines of type above and below, and to give them a support in metal. Each letter is composed of three parts, known as the body mark or body marks, hair-lines and serifs. The body marks are the heavy strokes in the letter, or its framework; the hair-lines are the fine strokes which connect the others or join on them, and the serifs are the endings to marks, which form a sort of finish. There are also crossbars. Each of these may be of different thicknesses, but those of one letter should compare in weight, length and form to others in the same font. Thus n, m and u must resemble each other, and d, b, p and q are much alike. The hair-line in small letter is without much thickness, but there is a thick, heavy line. In a series the thickness of the heavy line in pica must be twice that of the heavy line in nonpareil. The serifs are the jagged endings to letters, so called because of their resemblance to a saw. It is difficult to estimate proportions in a small letter, as the gauges used are not minute enough; but taking a large size of Bruce's No. 16 as a standard, the proportions of the letters are as follows: Suppose that the total size of the body, up and down, is twenty-five, one of these parts is divided so that half of the shoulder lies above and half below the face. This leaves twenty-four parts to the face. The letter u covers ten parts and the letter l seventeen parts, seven parts therefore being above the small letters. Seven parts are also found below, to make up the descending letter to seventeen. The heavy strokes in lower case are two parts wide, and in capitals two and a half. There is the same shoulder at the sides of the letter as at the top and bottom. The body of a capital being three parts, the full-sized serifs are seven parts, thus projecting considerably over the main line of the letter. This face, upon the whole, is light. To draw it upon a diagram would require 625 squares. By minute changes in this or that particular each face of type assumes a different appearance to the eye, although only experts can tell where the differences are.



Letters in various languages have different forms, although from the same original. In the article upon GREEK LANGUAGE two different kinds of ϰ are shown. Our & has assumed a new appearance within the memory of man, being originally et, written together. There is a marked variation between the w as shown by Italians and as it is made in this country. Particular letters mark the products of particular presses, as the R bizarre marked one printer in the early ages of printing, and the crossbar on lower-case letters indicates the works produced at the French government printing-office. It is by examination and comparison of early letters that we are able to decide who the printers were who produced noted works at the dawn of printing.

2. Letter is used collectively for type. A printer will say, "There is no letter," meaning that there is no type. Both type and letter are usually used in the singular form when referring to fonts or quantities. The plural is used when distinction between different kinds is noted.

Letters occur in actual use in a very different ratio from the schedule furnished by the type-founder. Different copy runs on different sorts, and the type-founder therefore furnishes the lesser sorts in an abundance which rarely allows a deficiency, except upon figures or some special publication. The cases on daily papers are very carefully sorted up; but when the type has run out there is still in the neighborhood of fifteen pounds left in each pair. Several years ago the names in the New York Directory were counted, each under its appropriate letter. The total number of names was 313,992, and the letters were thus distributed, the true proportion according to the type-founders being in another column:

	Directory.	Type-founders' Scheme.		Directory.	Type-founders' Scheme.
A . . .	7,643	17,800	N . . .	5,604	12,000
B . . .	29,721	12,000	O . . .	5,924	12,000
C . . .	21,808	14,800	P . . .	10,540	11,800
D . . .	16,016	14,600	Q . . .	919	5,000
E . . .	5,971	17,600	R . . .	15,927	12,000
F . . .	14,408	12,000	S . . .	33,652	14,500
G . . .	15,560	11,800	T . . .	8,098	19,000
H . . .	24,842	11,800	U . . .	1,114	9,000
I . . .	1,106	23,600	V . . .	3,728	9,000
J . . .	5,429	8,900	W . . .	18,663	11,000
K . . .	15,798	8,900	X . . .	10	5,400
L . . .	15,097	14,600	Y . . .	913	9,000
M . . .	34,048	12,000	Z . . .	1,453	2,000

It will be seen that the order of frequency in this directory was M, S, B, H, C, W, D, R, K, G, L, F, P, T, A, E, O, N, J, V, Z, U, I, Q, Y, X. There is an undue proportion of some names of foreign extraction, which renders this an unsafe guide for places where English surnames are alone to be found.

Letter-Board.—Two or three thin boards, smoothly planed and fastened at the back to two transverse pieces, thus making their surface somewhat like the top of a table. Upon letter-boards forms are often laid for unlocking and distribution, and they are used in many offices to receive forms which are to be kept standing, then being put into racks.

Letter-Brush.—A brush used for taking dust from type.

Letter-Founders.—A term frequently employed for type-founders.

Letter-Foundry.—A type-foundry. The term is more used in England than here.

Letter Hangs.—If the compositor is careless in emptying his composing-stick so as to set the letter down loosely on the galley, and they do not stand perfectly square and upright, the letter hangs; or if after overrunning on the correcting-stone he has not set his letter in a square position again, before he locks up, the letter thus out of square is said to hang. This is Stower's definition. The term is not used in America. The equivalent here is to say that the letter is off its feet.

Letter-Headings.—Printed headings for paper intended to be used for epistolary purposes. When executed for private persons not in business the caption is usually very small and neat, but for commercial or manufacturing firms they are sometimes very elaborate. The favorite size upon which they are printed is letter, 10 by 16 inches; but commercial letter, 10½ by 16¾, or 10¾ by 17 inches, is sometimes used. These may be cut from folio post. Smaller paper is also used.

Letter-Mold.—The apparatus used for hand casting of types. See TYPE-FOUNDING.

Letter-Paper.—A writing-paper which is of about the height of an octavo page, but wider. It is a folded paper, and its size is generally 10 by 16 inches when unfolded. In England this size would be a half demy.

Letter-Press.—Type work, as distinguished from lithographic work and steel and copperplate printing.

Letter-Rack.—A rack or frame for containing metal and wood letters of such a size that it would be inconvenient to keep them in cases.

Lettera (Ital.).—Letters.

Lettera Ascendente (Ital.).—A cock-up letter.

Lettera di Due Righe (Ital.).—Two-line letter.

Lettere a Mucchio (Ital.).—Type which has fallen to the floor and is afterwards picked up.

Lettere in Legno (Ital.).—Wood letter.

Lettere Superiori (Ital.).—Ascending letters, such as d, h and the capitals. Lettere inferiori are descending letters, such as g and y. The term lettere superiori is also used for superior letters, or small letters at the top of a line.

Lettering.—Placing letters on the back or sides of books, either in gilt or blind. The old usage was to do this letter by letter, which required a very steady hand and much experience. The more common method is to set the letters together and make the impression at once.

Lettering-Block.—A piece of wood of which the upper surface is slightly rounded, upon which side labels are lettered.

Lettering-Box.—A wooden box in which hand-letters are kept by bookbinders.

Letter's Out.—When type runs short through being all in use.—*Jacobi.*

Lettre de Forme.—The kind of black-letter used by the first printers for the Bible and theological and devotional works. It was an imitation of the formal hand of the German scribes. It is a pointed Gothic (this word not being used in its modern printers' sense). Caxton's type No. 3 is an example of it. Specimens are still produced by type-founders. The face is regarded as good and satisfactory, and with it the best English typography was executed in the fifteenth, sixteenth and seventeenth centuries.

Lettre de Somme.—A character engraved almost at the beginning of printing. It is a round Gothic or Gothic shorn of its angles (the word being taken in its historical sense, and not as printers now use it). It was very little used in England.

Lettura (Ital.).—Cicéro of the French series, which is a little larger than our pica.

Levant Morocco.—Morocco leather made from the skin of the Levant goat, which has a larger grain than Turkish morocco.

Levare la Correzione (Ital.).—To set up in a stick the letters necessary to make corrections in a form.

Levare la Lettera (Ital.).—Picking up type. Leva bene la sua lettera, he lifts his type well.

Lever.—The handle of the hand-press, by which an impression is taken; the bar, the devil's-tail.

Levigatore (Ital.).—A calendering-machine.

Lewis, Charles, the most eminent bookbinder in Europe of his day, was born in London in 1786, was apprenticed to D. Walther at fourteen, worked as a journeyman in several shops in London, and finally began business on his own account in Scotland Yard. His work was much esteemed. He did all of the binding for Earl Spencer, the Duke of Sussex, Sir Mark Sykes, Thomas Grenville and other eminent bibliophiles. His books, said Dibdin, seemed to move on silken hinges. He died on January 15, 1836, and was succeeded by his oldest son.

Lewis, Ellis, Chief Justice of Pennsylvania, served his time as a printer in the office of Abraham Paul, in New York, and became interested in law by setting type on law cases. He began to attend the courts, and after a few years entered the legal profession. He was employed as a printer in the same offices with the two elder Harpers, General Morris and Woodworth, the poet, and ever retained a great liking for his early pursuit. After going to Pennsylvania he became an editor of a newspaper, a member of the Legislature, attorney-general, and finally chief justice. He was also known as an author. He died in 1871, being then about seventy-five years of age.

Lexicon.—A book containing the words of a language arranged alphabetically and defined, generally confined to dictionaries of the Greek, Latin, Hebrew and other dead languages.

Libel.—This is a malicious defamation, expressed either in writing or by signs, pictures, &c., tending either to blacken the memory of one who is dead or the reputation of one who is alive, and thereby exposing him to public hatred, contempt or ridicule. Such a species of defamation is called written scandal, and from the consideration that the offense is committed upon greater deliberation than the mere utterance of words, which are frequently used hastily and without thought, and because the effect of a writing continues longer and is propagated further and wider than verbal defamation, it is generally treated as a more serious injury than slander. Whatever written words tend to render a man ridiculous or to lower him in the estimation of the world amount to a libel, although the very same expressions, if spoken, would not have been slander or defamation in the legal sense of those words. To complete the offense publication is necessary, or the communication of the libel to some person. The mere writing of defamatory matter without publication is not an offense punishable by law.

The law of libel is very important to printers, editors and publishers, as the former may innocently print such things as shall constitute a libel, and be liable to damages therefor, and the latter, through their agents, may write and publish matter which will fall within this definition. It may be said generally that charging a man with a felony or an atrocious offense is a libel. Thus to charge that a man has committed murder, robbed a bank, defaulted with funds, seduced a woman or set fire to a building is a libel. An aggravated attack upon a man's character is a libel, as to declare that he is a hypocrite or a drunkard, and it is also a libel to declare that he has failed in business when he has not done so. In general he must be charged with something which will lower him in the estimation of the public, or which shall prevent him from following his calling or business as before. It is sufficient defense in this country to show that the charge is true; but this course is frequently difficult to pursue, although there is really no doubt of the matter. Legal proof is hard to obtain, and an attempt at justification, if not borne out, aggravates the offense. Palliatives may be suggested, and efforts can be made to show that the injury is not as great as claimed, or that no injury at all followed. Thus, if damages are claimed on account of injury to credit or mercantile reputation by a certain libel, it is competent to offer evidence that the injury was not as great as claimed; that the merchant's sales did not fall off, that his paper was quoted as well after as before, and that a loss which he had at that time was justly attributable to another cause. Condonation can also be set up. In general juries in this country will not give exemplary damages unless it is shown that real injury has been received, but there is a very great uncertainty about their verdicts.

In England the law is still much stricter than here. By common law it is wholly immaterial whether the libel be true or false, and in a criminal prosecution the defendant is not allowed to urge the truth of the publication by way of justification. This has been somewhat modified in that country, and here such strict rulings have been completely done away with by statute and by the decisions of the courts. This was owing largely to the defenses of Bradford and Zenger, in the pre-Revolutionary period; to the arguments of Alexander Hamilton, subsequently, and to the common sense of mankind. No punishment should be inflicted for what is no offense. It may also be shown that the matter was privileged; that is, that it was published by order of the public authorities, or that it was only communicated to certain other persons in such a way as not to constitute them the public. The publication was a private one.

Newspapers are peculiarly liable to libel suits. The editor cannot know all of the circumstances relating to an affair, and the reports he receives, hastily brought together, are frequently published without careful revision. It has therefore been claimed by many publishers, individually, and by several of their associations, that the law should be so altered that no damages could be collected where the publication was shown to be in good faith, and the newspaper was willing to publish a retraction. No action, however, has been taken by Congress or the various State Legislatures in the direction desired.

Liberty of the Press.—The right to print upon every subject as fully and freely as may be desired without incurring any penalty, or without being subjected to a censorship. At the dawn of printing each printer did little work, but as soon as the number of publications increased it was found expedient to put the press under strict control. More or less this has continued until the present time in all countries excepting the United States and England and its colonies. No real liberty of the people can exist in any country where freedom to print does not exist, where the public servants are not called to account, and where their actions cannot be reviewed. See CENSORSHIP OF THE PRESS.

Liberty Press.—An American treadle platen machine for jobbing purposes; also known as the Degener. It gives good distribution, takes on a sheet of paper larger than the bed, and is regarded as very strong.

Libraire (Fr.).—Bookseller.

Libraire Juré (Fr.).—A sworn bookseller. Booksellers in France were formerly licensed and sworn, the number being limited.

Librairie (Fr.).—Bookstore.

Librarii (Lat.).—Transcribers of books in ancient Rome.

Librarioli (Lat.).—Those persons in ancient times who ornamented books, placed devices upon the margin and supplied titles and terminations.

Library.—A collection of books. The gathering together of manuscripts and records must date back nearly to the beginning of writing. The Bible itself is a number of books of different kinds brought together. In Greek its name is "the Bibles," and during the Middle Ages it was frequently spoken of as "the Library," "the Bibliotheca." Its first translation, the Septuagint, was written to enlarge a greater library, the Alexandrian, the most famous and the largest of antiquity. This library lasted nine hundred years, until destroyed by the Mohammedans. The Greeks and Romans had libraries, although not extensive as we now regard them. Some have come down to us buried under the dust and lava of Vesuvius, but owing to the difficulty of unrolling the books and the small value of those which have been examined little addition has been made to our knowledge by those collections. Copyists existed in all of the important cities of ancient Europe, as well as in India, Asia Minor, Egypt and China, and the manuscripts transcribed by them were in turn copied by others. Of those not preserved by volcanic burial the oldest seem to be of the fourth century of our present era. The books which were regarded as having the greatest value were most frequently copied. It is for this reason that we have more copies of the Bible in manuscript than of any other book. Papyrus, used at the dawn of Christianity, was changed to parchment, succeeded by vellum afterwards. When paper came in it also was used. The form of books changed from rolls to rectangles, each then being composed of many little sheets brought together and fastened at one side. The monks and other religious persons of the Middle Ages did much in copying, but until fifty years after the invention of printing professional scribes continued to copy ancient works and to engross new ones. Prices were, however, very dear.

Since printing began almost every prince, every university and every learned society has endeavored to bring together a collection of books. These are now much cheaper than a hundred years ago, and libraries have become common. Towns in America which most Englishmen have never heard of have now more numerous collections of books than the Bodleian Library or the British Museum had in the last century, although not so valuable, and this spectacle is also witnessed in small towns in England, Canada and Australia. It is supposed that about six millions of distinct books have been published in all since 1450. Every library, therefore, must be composed of a portion of these books, for it would be impossible to get them all together in one place. A library in Great Britain would have more books in English than one anywhere else; one in France more in French than one in any other country, and like preponderance of Danish would be found in one at Copenhagen. All alike, according to their means and their antiquity, would have classical works, but their value in medicine, ethnology, geography and other particular topics would depend upon the taste of the authorities and the money at disposal. In some cases internal dissension or bad government has prevented great collections relative to the literature and history of one country from being made within its borders, and the best library of that nation is a portion of one in some foreign country. Until a few years ago the British Museum had more works relating to America than any library on this side of the Atlantic, and there is nothing in Poland, Russia, Austria or Prussia compared to its Polish collection. The most available library for the study of Spanish literature is in Boston.

The difficulty in administering a library arises from the great multiplicity of subjects with which the mind of man deals. Each of these is capable of being indefinitely subdivided. Take, for example, history. The common division is into ancient and modern. The modern again is divided by continents, and these by countries. America has first an analysis into North and South America and the West Indies. North America has Canada, Mexico, the United States and some others. The United States is taken up by States, and each State by its towns. In the State of New York there are nearly a thousand towns, each having some one or more books about it, but some having a hundred. Concerning the city of New York there are more than a thousand. It will therefore be seen how difficult it would be to obtain a full collection of books respecting any part of the country, and it would be much more difficult to do so with the country at large. There are hundreds of studies and fancies in which collections might be made, as chess, angling, dogs, earthquakes, music, folk customs, or dueling. The librarian who seeks to have a collection of value in any of these departments must be a student of the subject himself, and must have patience as well as money. Libraries now collect everything. What is valueless in itself may have great value in relation to other things. When the Bodleian Library was begun its founder, Sir Thomas Bodley, thus wrote to the librarian: "I can see no good reason to alter my opinion for excluding such books as almanacs, plays, and an infinite number that are daily printed of very unworthy matters and handling, such as methinks both the keeper and under-keeper should disdain to seek out to deliver to any man. Haply some plays may be worth the keeping, but hardly one in forty." In consequence of this opinion it was for more than two centuries the practice of the library to destroy any book that the keeper did not believe to have permanent value. As a result the Bodleian Library has lost thousands upon thousands of books which would now sell for upwards of a pound apiece, and many which are worth a hundred pounds. No one can estimate the demands of posterity.

In the management of a library there are many problems. The books must be obtained, catalogued, given a location and bound. Nearly all libraries receive a large share of their increase by donation, others being bought. Pamphlets of a kind are usually bound together, but are often preserved in cases. Most libraries classify their books by subjects and locate them on the shelves by their numbers. When this is done a considerable space must always be left for additions. A list of accessions is made when the books first arrive, and it is usual then to examine bills, if purchased, and collate the books to see if they are perfect. When these are donations a letter of thanks is sent. If the books are injured in the binding, or if that is not good enough, they should be sent to the binder, a list being kept. They do not appear on the accessions catalogue until they have returned. Shelves are usually open, with a network of wire. If open, however, much dust is deposited. Glass doors are too expensive for public libraries. The two lowest shelves are usually appropriated to quartos and folios, the smaller books being above. The highest shelf should not be too high to reach, and it is wrong to have books in galleries, where the warm air gradually takes all of the life out of the binding and paper. Catalogues are usually made by experts, each book requiring one slip of paper and no more. When the catalogue is complete the books are then alphabetized. There are four ways of cataloguing. One is by the author, the second by the subject and the third by the principal word first occurring in the title; and the fourth by the main word in the title. In the following examples may be seen each of the principal ways:

DAVIES, THOMAS. Memories of the Life of David Garrick, Esq., Interspersed with Characters and Anecdotes of His Theatrical Contemporaries. *Portrait.* New Edition. 2 vols., crown 8vo, calf. London: Printed for the Author. 1780.

DRAMA. Memories of the Life of David Garrick, Esq., Interspersed with Characters and Anecdotes of His Theatrical Contemporaries. By Thomas Davies. *Portrait.* New Edition. 2 vols., crown 8vo, calf. London: Printed for the Author. 1780.

MEMORIES of the Life of David Garrick, Esq., Interspersed with Characters and Anecdotes of His Theatrical Contemporaries. By Thomas Davies. *Portrait.* New Edition. 2 vols., crown 8vo, calf. London: Printed for the Author. 1780.

GARRICK, DAVID, Memories of the Life of, Interspersed with Characters and Anecdotes of His Theatrical Contemporaries. By Thomas Davies. *Portrait.* New Edition. 2 vols., crown 8vo, calf. 1780.

The first and fourth of these are preferable. The third has little to recommend it. The second has a head over the top of this and other works on the drama, instead of being in the line with the title. This title might also come, in a classified catalogue, under the heads of Biography, Theatrical Biography, England in the Eighteenth Century, and London. The last two would be rather remote. By writing the title on a piece of paper and then using a hectograph as many copies can be made as may be desired. Words supplied are commonly denoted by brackets; sentences supplied are in Italic; lines or words omitted are shown by stars or leaders. In all titles, except those where exact reproduction is desired, unimportant words and sentences are omitted. The date and place of printing should always be given, and it would be desirable to give the number of pages, size of page and name of the printer, if possible. In booksellers' catalogues the binding is specified, but this is not usual in libraries.

The chief libraries of the world are in Europe. In England they are the British Museum and the Bodleian; in France the National Library and in St. Petersburg the Imperial Library. There are many large libraries in Germany, and the collection at the Vatican in Rome, although excelled in size by some, is of the greatest value. There are many large and valuable libraries in other countries of Europe, and there are large ones in China. Australia is beginning some valuable collections. In the United States the two chief libraries are the Congressional Library at Washington and the Public Library in Boston. There are fine collections in the cities of Cincinnati, Chicago, Albany, Worcester and Providence; and the Athenæum at Boston, the Astor, Lenox and Mercantile in New York, those of Harvard College at Cambridge, Yale College at New Haven, and the Library Company at Philadelphia are particularly worthy of remark. Almost all American libraries are strong in books relating to America, and there are more than a hundred societies which have the gathering of this kind of literature as their chief object. The public and semi-public libraries of New York embrace about two millions of volumes. In every part of the United States there are small libraries, forming a valuable part of the public-school system.

Book collecting has wonderfully increased within the last half century, and special private libraries have become common everywhere. When a collector dies his library frequently forms the nucleus of one in some public institution. There are several hundred such collectors in New York city, and several thousands in the United States, some of their libraries rising to fifty thousand volumes. In the Old World they are equally numerous. One, the Althorpe, rich in the accumulations of generations, has lately been sold, and will form the most valuable part of an assemblage in Manchester. Bibliography has been much promoted by these collections.

Libro (Ital.).—Book.

Lichtdruck (Ger.).—Relief printing by light. It is a process invented by Albert and perfected by Bolhövener and Heidenhaus in Munich, by which outline drawings are photographed, then being reproduced on the printing-press.

Lier (Fr.).—To tie up.

Lift.—1. A form lifts which when locked up can be raised from the stone without having any letters drop or any matter sink down. 2. In the warehouse a lift is as much paper as is put up at once upon the poles to dry, being from half a quire to a quire. 3. The quantity of paper put up at once upon the feed-board of a press. 4. The apparatus for sending forms, paper or any other heavy articles from floor to floor, generally known as an elevator in America.

Ligaturen (Ger.).—Ligatures.

Ligatures.—Abbreviations of words have been very common since the invention of writing. In order to save time new ones have constantly been invented, and after the discovery of printing that form of them which consisted in tying two or more letters together was imitated. Some of them have been kept up in metal until the present time, as ℔, but the tendency of the age is to discard them. We have in nearly all faces ﬂ, ﬁ, ﬀ, ﬃ and ﬄ, and in old style ct and several others, although these amount to nothing compared with those the early printers used.

JOHN E. LIGHTBODY.

Lightbody, John E., an early ink manufacturer, was born on August 15, 1816, and in 1830 went into the employment of George Mather, in New York, with whom he remained for ten years. In 1840 he began business for himself, chiefly devoting himself to the preparation of news inks. His nature was a very genial and kindly one, and he made many warm friends. He died in 1869.

Light-Face.—1. That kind of type in which there is no excess of weight in the lines as contrasted with a heavier one. 2. A kind of type in which the heavy lines have been much diminished in thickness, these affording little contrast with the fine strokes. The most common variety is a light-face extended, as herewith:

This is Light-Face Extended.

Light Tints.—The lighter parts of an engraving in printing.

Lightning Press.—A term once applied to the large type-revolving presses manufactured by Hoe, but now superseded. These presses far surpassed in speed all which had previously been used, and consequently received this appellation. The fastest could theoretically print thirty thousand sheets in an hour, but practically fell far below that number. Ten men were required to feed.

Ligne (Fr.).—Line; la ligne de tête, the running title.

Limp Work.—In binding, to have the covers of some material which is not stiff and which bends easily.

Lindsay, James, one of a family of type-founders, was born in Glasgow, Scotland, in 1825. In 1851 he came to this country at the solicitation of George Bruce, and after Mr. Bruce's death was a partner with his son under the firm-name of George Bruce's Son & Co. He was a man of great skill. He died on September 2, 1879.

Line Beginnings.—A piece of metal cast in blank to fill the beginning of a line in Didot's script. This was not upon a rectangular body, and consequently at the beginning and endings of lines something more was needed to insure solidity, which was given by this triangular piece.

Line-Book.—The book used by compositors in making up, showing the progress of any particular work, and the debtor and creditor account of lines to each hand engaged thereon.—*Jacobi*. In America this plan is obsolete.

Line-Engraving.—A style of copper and steel plate engraving in which the effect is produced entirely by combinations of lines. It is executed either by direct incision with the graver or the dry point, or by a combination of incision with etching. It is regarded as the highest kind of engraving. Wood-cuts are also frequently cut in pure line.

Line-Formers.—Brass rules so bent that they are of assistance to the compositor in forming curved lines. They consist of two rigid strips of brass the height of a quadrat. At the beginning of the top strip is a stop, and at the end of the bottom one there is another.

Line is On.—When companionships of compositors have resumed work after an enforced idleness the line is said to be on.—*Jacobi*.

Line of Quadrats.—A blank or white line formed of quadrats.

Line of Stars.—A line of asterisks, thus:

* * * * * * *

to indicate an omission in any sentence or paragraph.

Line Off.—In companionships of compositors it is customary to deduct a line off per hour to counterbalance the trouble of leading matter, &c.—*Jacobi*.

Line On.—Sometimes a line on per hour is added when work is exceptionally fat.—*Jacobi*.

Linea (Sp.).—Line; línea en blanco, blank line.

Linea Ladrona (literally "stolen line").—A word forced over so as to make a fat line at the end of a paragraph. Línea de pié, foot-line.

Linear Papers.—Papers made with water-marked lines at given distances to guide handwriting.—*Jacobi*.

Linen-Faced Paper.—Paper having one or both sides covered with linen. Folded cards are often linen-faced to prevent them from breaking in half at the bending, and so are some kinds of children's books.

Lines.—A compositor on piece-work is said to be on his lines.—*Jacobi*.

Lingote (Sp.).—Slug.

Linie (Ger.).—A line; a rule.

Lining.—The exact correspondence of all letters of the same class in a font with each other in regard to their height and depth. Thus DOREMUS lines perfectly, but THOMPSON does not. The bottom line of the capitals, excluding Q, and the bottom line of the small lower-case letters, as in "uncommon," must line together. So must the ascending letters with each other and the descending letters with each other. Good lining is a matter of much importance.

Lining-Figures.—Figures made according to the general arrangement used at present, when they fill exactly the same space, and are of the same height and depth, in contradistinction to old-style figures, which do not line. Thus the ten figures are when lined: 1 2 3 4 5 6 7 8 9 0; when unlined: 1 2 3 4 5 6 7 8 9 0.

Lining-Papers.—The colored or marbled paper at each end of the volume. Called also end papers.

Linotype.—See MERGENTHALER MACHINE.

Lippincott, Joshua B.—The house of the J. B. Lippincott Company, in the city of Philadelphia, is one of the most extensive in the country. It was founded in the last decade of the last century by a bookseller named Johnson, who had a small place on Fourth and Market streets, which he afterwards sold to Benjamin Warner. In 1816 John Grigg became a partner. After Mr. Warner's death the firm became Grigg, Elliott & Co., the second partner being Hugh Elliott. In 1850 J. B. Lippincott, who was then in business for himself, bought the interest of Mr. Grigg in Grigg, Elliott & Co., and the firm became Lippincott, Grambo & Co. Mr. Lippincott was born at Burlington, N. J., went to Philadelphia in 1830, and obtained a position in a bookstore. In 1836 he founded the firm of J. B. Lippincott & Co., succeeded later by the J. B. Lippincott Company, an incorporation. He died in 1886. Printing, bookbinding and all departments of the business are carried on in the company's warehouses on Market street, five stories high, and 50 by 345 feet in area. The great specialty of the house is the jobbing of books, but it also publishes a great number.

Lira (Sp.).—"Lyre," a name given to the body of hand-presses on account of its shape.

Lisciva (Ital.).—Lye.

Literals.—Literal errors; that is, one letter for another, turned letters, wrong fonts, a letter repeated, and so on.

Literary Property.—In the whole compass and variety of the products of human labor no one thing is more exclusively such than intellectual works. In the fabrication and production of almost all other subjects of value and property the materials are supplied, directly or indirectly, by the earth or the water, and man only joins with nature in furnishing the article; but a piece of music, a painting, a poem, an oration, a history, or a treatise of any description is the offspring of the unaided labor of the mind. It is supplied from abroad only with the canvas, paper, parchment or whatever other substance is used for recording the work and affording the evidence of its accomplishment, but which is no more a part of the thing produced than a deed conveying an estate is a part of the thing conveyed. Although the right to the products of intellectual labor is thus peculiarly positive and absolute, it is among the latest rights of property recognized in a community, since the subject of it, the product itself, is only the result of an advanced state of civilization. Another reason why it did not attract more early attention is its abstract, incorporeal nature, and also, in some cases, the difficulty of defining and identifying it and deciding what is an abridgment of this right of property; and again in some countries speaking the same language as those bordering upon them the great difficulty of protecting this kind of property from infringement, although no doubt arises as to the identification of the thing claimed, or in determining what shall be considered as an infringement. The question whether an author has, of common right and independently of any special statute in his favor, a property in the products of the labor of his mind, as unquestionable and absolute as any other producer has in the labor of his hands, was very elaborately discussed in the Court of King's Bench and in the House of Lords in England in the time of Lord Mansfield in the celebrated cases of Millar against Taylor, reported in the fourth volume of Burrow's Reports, in relation to the copyright of Thomson's Seasons, and Donaldson against Becket, reported in the same volume. The first of these cases came before the court in 1769. In 1709 the statute of 8 Anne, chapter 19, had been passed, giving to authors an exclusive copyright for the term of fourteen years and no longer. Notwithstanding the limitation of the right to that term by the statute it had been held in divers cases, subsequently decided, that the exclusive property of the author or his representative continued after the expiration of the fourteen years, and accordingly in 1739 Lord Chancellor Hardwicke granted an injunction against a person, other than the proprietors, printing Milton's Paradise Lost, the title to the copyright of which was derived by the proprietor through an assignment executed by Milton seventy-two years before. In the case relating to Thomson's Seasons three of the judges, Lord Mansfield and Justices Aston and Willes, were of opinion that the exclusive right of property continued after the expiration of fourteen years from the first publication, as limited by the statute of Anne, and such was the decision of the court. Mr. Justice Yates dissented from that opinion. Five years after, in 1774, the other case came before the House of Lords, and, as is usual with that tribunal, the opinion of the judges of the King's Bench, Common Pleas and Exchequer was taken. Lord Mansfield, being a member of the House of Lords, did not give an opinion in answer to the questions propounded by the House, but acted and voted as a member of the body. Of the eleven judges who gave opinions eight were of opinion that an author had of common right—that is, as by the common law, or without any statute to this effect—the exclusive privilege of publishing his own works, and three were of a contrary opinion. Seven, against four to the contrary, were of opinion that by publishing his work and vending copies he did not abandon his exclusive property to the public, or in other words, that by making and selling one copy he did not authorize all other persons to make and use and sell as many copies as they might choose. The House of Lords decided against the author, on the ground that the statute of Queen Anne took away his rights after fourteen years, and this has been acquiesced in ever since by lawyers. During the last years of the reign of George III. the time was extended to twenty-eight years, and if the author is living at the end of that time it is continued for his life. In the United States it was at first for fourteen years, but in 1831 it was extended to twenty-eight. See COPYRIGHT and INTERNATIONAL COPYRIGHT.

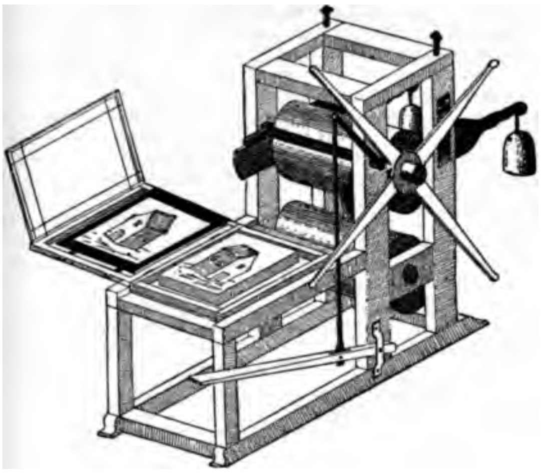
Litho.—A short term for lithography, much used in England.

Lithograph.—A print from a lithographic stone.

Lithographic.—Pertaining to lithography.

Lithography.—The art of printing on stone, but popularly used for any method by which an impression can be obtained from a plane or nearly plane surface by taking advantage of the repulsion of water from greasy inks. The lines made by these inks on the plane surface are the designs to be printed, and the printing-ink, when distributed over the face of the stone, is left only on these lines, the rest of the surface repelling the ink because covered with water, between which and the ink there is no affinity. Formerly a peculiar kind of stone was the only substance known which would permit of designs of the desired fineness and quality being drawn or impressed upon it, but lately zinc has been much used, and some other materials have been tried.

This art is the newest of all those employed in printing. Wood-cuts, process cuts and type have in relief the lines which are to be printed; copperplate and steelplate work depend upon hollows in their surface, in which the ink is collected, then being submitted to pressure against the paper, which takes a great portion away. Several stories are current of the method in which ALOIS SENEFELDER (see under this name) discovered the art. All are agreed, however, that it was the result of an accidental impression upon a stone, happening in the presence of a man whose perceptions had been keenly cultivated, and who was able to appreciate the discovery he had made. Senefelder was an actor at one of the theatres in Munich, but had for a long time tried to find some method by which he could print music cheaply. He immediately began his efforts to improve the art thus opening to him, and in a short time was able to produce commercial work. In this he was first joined by a musician, Gleissner, and his wife. The discovery was in 1796, but for a long time the stone was drawn upon with a lead-pencil and then again drawn upon with ink. A professor in the military academy, Schmidt, claimed a prior discovery of the art, and for some time gave trouble to Senefelder and his friends by his assertions; but the proofs given of the priority of Senefelder's claim were too great, and opposition gradually died away. Towards the beginning of this century lithographic shops were opened in Vienna, Paris and Berlin, and in the year 1801 André, a music dealer, began work in London. The process met with very little encouragement in that city, nor was it till 1819 that it became well known there as a branch of business. In all of the places named those who practiced the art first received authority from Senefelder, but after 1804 many others began in rivalry, and the business of printing on stone was introduced into many cities of Europe. Naturally many inventions were made to facilitate the execution of work, and from 1820 down there has been in every European country, and from 1830 in America, a number of establishments turning out work in quantities only limited by the resources of the art.



SENEFELDER'S PRESS.

Lithographic printing was first executed in the United States in the year 1819, but it led to no practical results. In 1825 lithographers had established themselves in New York, and in that year Colden's account of the celebration in honor of the Erie Canal was published, containing a large number of lithographic engravings. These were executed by Imbert. In 1828 Pendleton Brothers, plate-printers and stationers in Boston, added lithographic presses to their establishment. In 1829 John Pendleton, one of the brothers, went to Philadelphia and set up a lithographic printing-office in conjunction with others, as Pendleton, Kearney & Childs. In 1830 John Pendleton went to New York and began business, but there had been three or four predecessors. The art began in Baltimore in 1831, an artist named Swett being the earliest. In 1831, it is stated by Peter S. Duval, there were only three establishments of this kind in the United States, employing but eight presses in all. Progress was not great until the next decade, and the work produced was generally of an inferior kind. It received a great impulse forward from the efforts of Louis Prang, who about 1860 began the execution of works hitherto attempted only in the Old World.

The most marked improvement in the trade since its introduction into the United States has been the employment of power-presses. Until 1860, or after, all lithographic work was done on hand-presses, the utmost performance being about two thousand impressions a day. The first steam-press is said to have originated in Paris in 1850, the inventor being named Engues. He sold the patent for England to Hughes & Kimber, press-builders of London. They made important improvements, and introduced it into the United States in 1866. Another kind was made in Massachusetts prior to this time, and some time after Hoe began their manufacture. Several other builders have since sprung up, and the machine is far better than the earliest designs. The speed is lower than on type presses, but reaches beyond a thousand an hour. The problems in its construction are two. The stone is of varying thicknesses, and consequently the bed of the press must be far enough from the cylinder to permit a thick one to be used; but when a thin stone is employed the bed is so constructed that it can be raised to the desired height. The stone also must be wet or moistened at each impression. This is done by rollers passing over its surface which are in a moist state. The blanket of the press is soft or medium, it being impossible to use really hard packing.

Lithography was often termed in its earlier days the chemical process. Senefelder says: "The lines and points to be printed ought to be covered with a liquid to which the ink, being a homogeneous substance, must adhere according to its chemical affinity and the laws of attraction, while at the same time all those places which are to remain blank must possess the quality of repelling the color. These two conditions, of a purely chemical nature, are perfectly attained by the chemical process of printing, for common experience shows that all greasy substances, such as oil, butter, &c., or such as are soluble in oil, as wax, bitumen, &c., do not unite with any watery liquid without the intervention of a correcting medium, but that on the contrary they are inimical to the water and seem to repel it. The principal dissolving and uniting liquid for the above-mentioned substances is alkali, which, by proper management, forms a sort of soap soluble in water. Upon this experience rests the whole foundation of the new method of printing, which, in order to distinguish it from the mechanical methods, is justly called the chemical method, because the reason why the ink, prepared of a sebaceous matter, adheres only to the lines drawn on the plate and is repelled from the rest of the wetted surface depends entirely on the mutual chemical affinity, and not on mechanical contact alone."

The art, according to an early writer, is divided into two parts. The first is the execution of the drawing, which may be done by any good draughtsman, although of course better by those who are in the habit of working for lithographers. The second part is that of printing, which is filled with difficulties. On the hand-press it bears considerable resemblance to the methods employed in copperplate printing. The artist's part consists in drawing on a stone which has previously been made perfectly level and smooth. It is executed with an ink or chalk composed of greasy materials, in the same way that one would make a drawing on paper with ink or common chalk. The printer's part consists in taking the stone, as received from the draughtsman's hand, and obtaining impressions from it, as one would from a copperplate. To obtain these impressions the lithographer wets the whole surface of the stone, but as the greasy ink which constitutes the drawing has a natural aversion to water those parts of the stone alone which are not covered with the chalk imbibe it. The printer, while the stone is still wet, passes a thick and greasy ink over its whole surface, and the greasy lines of the drawing receive the ink while the wet surface of the stone refuses to take it. A sheet of paper is then strongly pressed on the stone, which, receiving the printing-ink applied to the drawing, gives a reversed fac-simile of the original. The stone is wetted afresh, again charged with ink, and thus a series of impressions is obtained. In the above description, declares the old writer, consists the whole art of lithography. New processes have since been invented, but the foundation of the art is as stated. Another name used for lithography in early days was polyautographic printing.

The stone employed in lithographic printing is nearly all imported from Germany, the chief quarries being at Solenhofen, in Bavaria. It is a kind of calcareous slate, pure, hard and of a fine grain, imbibing both moisture and grease with equal avidity. It varies in color from a light cream, dull yellow, drab or gray to darker shades of the same colors. The light tints are softer than the dark, and the gray are harder than the cream-colored stones. Some are uneven in color, having light and dark patches, which render them unfit for some classes of work. Holes, specks and veins are not uncommon. Stones are from one and a half to four inches in thickness, and are sold by weight, those which are double faced being much more valuable than the others. Nearly all used in this country are double faced. This great thickness and consequent weight is one of the reasons that have induced the use of zinc plates, as a large stone takes much force to lift it and much space in which to be stowed away. The European stones are imported with rough dressing, and are finished in the lithographic establishments where used.

When needed for the crayon each stone requires to be grained, and upon the skill with which this is done depends the beauty of the drawing. The graining must be fine, sharp and close together. If it is flat the pencil slips, and the resulting picture is monotonous; if it is coarse and far apart the result will be rough. A trough is covered at short distances by bars, upon which the larger stone is placed. Sand is sprinkled over its surface, usually of a coarser grain than that afterwards used. Water is thrown over the sand, a smaller stone laid upon the surface and kept going in a circular manner till the sand is ground very finely and is cleaned off. This is repeated two or three times, each time with a finer sand. The quality of the grain of the stone depends entirely upon the motion of the hand of the grainer. The sand should not be used too long, as it finally is reduced to mud. When to be employed immediately hot water can be used to clean with, as that will dry at once. If not needed soon the stones should be wrapped in clean paper, to prevent the face from being soiled. It is important that this grinding shall be with clean water, and that it shall be of considerable depth, as otherwise former drawings will influence and modify new ones. When the stone is to be used for pen-drawing or line-drawing, engraving or transferring, it must be polished with pumice-stone and finished up as marble is.

Pictures and most of the coarser work are executed with a crayon. This must have color enough so that the artist can see his drawing distinctly, and be fat enough so that it will penetrate the stone for some little distance, the top having sufficient attraction to seize the ink when the roller is passed over it. The crayon must also be hard, so that it can be cut to a point, and will not touch in any other place than where it is intended to leave a line or dot. If it is too fat it spreads too much, and if it has too little fat it does not make the required impression upon and in the stone, besides being very liable to have the point break off. According to Duval the proper proportion is pure yellow wax, thirty-two parts; mutton suet, four parts; white castile soap, twenty-four parts; salt of nitre, one part; and fine calcined lampblack, seven parts. There being water in the soap, it is best to cut that substance into strips and carefully dry it before using. The suet and wax are first melted and then the soap is added in small quantities, the whole being stirred continually. The nitre, which has been dissolved in seven times its weight in water, is added little by little to the melted mass, and finally the lampblack is incorporated, also in small quantities. The temperature is increased until the mixture takes fire upon touching the surface with a piece of red-hot iron. The saucepan is then covered to put out the flame, which is allowed to last one minute. The vessel is removed from the furnace, the top is again set on fire to burn up the scum, and the mixture is then poured upon a marble slab and divided into pieces. Afterwards it is melted again to incorporate the mass more thoroughly. The utmost care must be taken, and the process requires constant practice. Lithographers therefore generally buy the crayons they need from regular manufacturers. There are three degrees of hardness, known as No. 1, No. 2 and No. 3, but there is besides a still harder kind called copal, and there is a stumping-crayon. Differences in hardness are largely obtained by adding more nitre.

Lithographic drawing-ink is a hard ink, and is made in small pieces. It is composed of four parts of yellow wax, three of mutton suet, thirteen of white castile soap, six of gum shellac, and three of fine lampblack. Writing-ink for transferring is also a hard ink. It consists of five parts each of white wax, white castile soap, mutton suet, gum shellac, gum mastic and copal rosin, and three of flowers of sulphur. Other special inks are made for special cases, and there are many formulas for them.

In drawing or writing upon the stone special care must be taken that moisture shall not touch it. The hand or the breath may so affect the surface that it will be impossible to get good impressions. Every effort is made to prevent this injury by blocks of wood and by hand-rests. When work is done directly upon the stone the lines are reversed, so that they may print properly, and as it is very easy to commit an error it is usual to make an outline drawing which can be transferred to the surface by red chalk or other light substance. When this has been done the drawing is proceeded with until it is completed, either in ink or crayon; but as it lies chiefly on the surface of the stone it is liable to be rubbed off, and therefore a coating which will resist any application of water is applied to it. The first step taken is an acidulation. A preparation of eight ounces of gum arabic, thirty-two ounces of water, and one and three-quarter ounces of nitric acid is mixed together. This is quickly and evenly passed over the surface, acting on the parts of the stone which are not covered by the drawing, which is left intact. It brings the lines slightly into relief and at the same time prepares a lodgment for the water used in printing, as a portion of the surface is eaten away. After this is done the entire drawing is washed off with turpentine. The lines have penetrated to a sufficient depth to insure the chemical action, and a better result is reached than by allowing the crayon or ink marks to appear. The whole surface then looks like a blank. The washing is done first with clean water, which takes away the gum or acidulated mixture. Then the turpentine is applied with a sponge and immediately washed off. Care must be taken not to let any part of the turpentine dry on the stone. It will be found that the parts touched by the crayon will attract the ink and the parts untouched will repel it.

Pen-drawings and writing are executed upon polished stone. Before beginning a drawing the artist sprinkles a few drops of turpentine upon the surface, which he spreads quickly and evenly by a piece of rag. It facilitates the adhesion of the ink to the stone and enables the artist to produce finer and sharper lines. The ink is dissolved in water in a saucer. The pens are of little pieces of steel resembling watch-springs, mounted on small handles. They are cut and split with fine scissors. Engravings are also executed on polished stones, the face being prepared with a mixture of gum arabic and nitric acid, spread uniformly by a camel's-hair brush over the surface. Before it dries the surplus is wiped off with a rag so as to leave but a thin coating. Some coloring matter, like red chalk or lampblack, is then spread uniformly over the face. Unless this is used it would be difficult to see the work on the stone. Steel points and diamond points are used for the engraving. Linseed-oil or palm-oil is spread by the printer over the surface after the artist has completed his work; the stone is then coated with the same ink which is used in making the impressions for transferring, to which a few drops of linseed-oil have been added to make it softer. The ink lodges in all of the incised parts, while the other parts, protected by the crust formed by the gum and acid, remain unaffected. The stone being washed the impression becomes perfectly clear. In this kind of work the stone is inked with a dauber, or what letter-press printers would call balls, the roller being used only to take off the superfluous ink from the face of the stone.

Drawing or writing is frequently done on prepared paper with a special ink, and then the sheet is laid upon the stone and submitted to pressure, by which the greater part of the ink upon the paper is transferred to the stone, and there forms the design which is to be printed from. When this plan is adopted the writing or drawing is not reversed in the original. Transfer papers are prepared by coating the surface of paper with gelatine, starch or gum, either singly or in combination or united with other substances. The object of this coating is to interpose a soluble film between the writing or drawing, in lithographic ink or chalk, and the paper. Paper being more or less porous would, if used alone, absorb some of the ink instead of permitting the whole of it to be transferred to the stone. Hence the necessity of covering it with some substance which during the process of transferring can be moistened through the back of the paper, which is then peeled off, and the work, with the whole or part of the mucilaginous film, left upon the stone.

When the stone has the design placed upon it printing proceeds. The stone is always much thicker than type, which in this country is ninety-two one-hundredths of an inch in height. It must be perfectly level both at the front and back, this being tested by callipers and straight-edges. It comes from the dealer only roughly planed, the subsequent work being done by the lithographer. If not level upon the back the stone may break under pressure. It is laid upon a bed of india-rubber when printing is to proceed, and is fastened in securely by screws. When one stone is worked off the surface is ground to take off the design, the grinding going lower than the mere top, as the oily matter penetrates the material for some depth, and unless entirely removed the next stone will be influenced and shaded by it. This grinding may be from the sixteenth of an inch to a half inch, the latter when long editions have been executed and the oily matter has had a better opportunity to enter into the body of the stone. As this renders the stone thinner, there is a contrivance in the power-press by which the bed can be raised so that the matter shall meet the cylinder, and in the hand-press the scraper or instrument by which pressure is applied is lowered, just as an additional impression is given on the Washington press by changing the impression-screws.

On the hand-press the stone lies flat on a movable bed. The design is upon the upper surface, exactly like the printed matter, except that it is reversed. The pressman wipes the whole stone with a moistened sponge, which prevents the ink from adhering in any place except where the design is. Then he takes a roller in both hands, rubs it upon an ink-stone, and applies it to the lithographic stone. This rolling is done long enough to give every line of the design its due proportion of ink. The sheet of paper is laid on the surface, register being obtained either by the edges or by points, and the tympan is folded down, when the whole bed is run in. The tympan may have a leather, zinc or brass backing, and this back is perfectly smooth. There is no overlay upon the tympan, nor underlay beneath the stone. Differences in printing come from differences in the stone, the ink, the paper and the design. The instrument for giving pressure is called a scraper. It is a straight-edge at the press-head. Scrapers are made of boxwood from three to four inches wide and seven-eighths of an inch thick, the lower part being trimmed down to a V section about three-eighths of an inch wide at the bottom. For metal tympans these scrapers are covered with leather. The bed moves under and against this with considerable difficulty, as the pressure is great. It is propelled by a winch or rounce. On its return the pressure is again applied. The sheet when taken off is laid on a pile or heap, just as would be done at letter-press. Power-presses are built very similar to those used in letter-press work, the distance between the cylinder and the bed, however, being much greater. The water is applied by rollers, which are at the opposite side of the press from the inking-rollers. In fact the arrangement of one of these presses is not unlike that of an ordinary letter-press machine, in which the form is inked at both ends ; only in this case water is substituted at one end for ink.

Many attempts have been made to use other materials instead of stone, but so far, with the exception of zinc, they have not been very successful. Plates of zinc are much thinner than those of stone, and they can be procured in any quantity. The supply of first-rate stone is limited and cannot be increased until new beds are found. Zinc plates are likewise much easier to handle, and they are not liable to crack and break. Lithographic rollers are not made of glue and molasses or similar substances, but of leather upon a solid foundation. Composition rollers would be affected chemically. On hand-presses the core is of wood, about four inches thick and eleven or more inches long, with a taper-projecting handle at each end. This is covered with flannel drawn very tightly, and around this is the leather. The latter is made of the best part of a fine calf-skin, secured at the ends by a string passed through holes and the leather closely gathered up. They are prepared for use by rubbing into them before a fire some kind of grease that will not dry, such as lard or tallow. After this they are to be rolled in strong varnish frequently for a day or two, with an occasional scraping off the varnish with a knife. A roller once used for black inks cannot be employed for colored inks. As dryers are usually put into colored inks to make them dry promptly, it is necessary to clean the rollers immediately after they are done with. This is effected by scraping off as much ink as possible, then washing with turpentine and scraping again, and finally washing with turpentine and wiping with a clean rag. When a color-roller is done with for a time it should be well cleaned and tallow or lard rubbed into it. It should then be wrapped up and put away. Before using again the grease must be carefully scraped away and the roller washed with turpentine to free it entirely from grease. Color must not be allowed to dry on rollers. Roller handles are made of very thick leather. Sufficient should be cut to allow the leather to go around the handle without overlapping. The leather is then to be wet, tied around with a piece of string to keep it in shape, and allowed to dry, after which it will be found to retain its shape. These handles allow the roller to be gripped more or less as may be desired. Machine inking-rollers are the same in quality as those that are employed on hand-presses, but larger and longer. They have iron cores. The damping-rollers have iron stocks, several thicknesses of flannel, and outside coverings of some cotton or linen fabric.

The cylinder is covered with a thick, elastic blanket or by india-rubber. The latter substance is also used inside the tympan on a hand-press. The ink used is stronger and more tenacious than ordinary printer's ink, and is frequently thinned by varnish or ink in which no pigment has been mixed. It is made by subjecting the best linseed-oil to the continued influence of heat until it becomes more or less thick and viscid. It is of the different degrees of strength known in the trade by the terms thin, tinting, medium and thick. In chromolithography only a very small portion of pigment is used.

The gum-water is prepared by putting a certain quantity of gum into a vessel capable of holding four times as much. A few drops of carbolic acid or other substance are added to prevent decomposition, and the whole covered with water. It will dissolve in a day or two if frequently stirred. It should be applied to the stone when that is dry. The instrument is a sponge. It closes up the pores of the stone so that no washing with water will remove it, and it prevents the lines of the drawings spreading out. Gum should always be used when the printer has to leave his stone, if only for a few minutes.

A very large proportion of lithographic work is in colors. When the drawings are of any size they have a softness and delicacy far beyond the corresponding wood-engravings. Different stones are used for different colors, and a work in seven colors will require seven stones. As many stones as this will, however, produce a number of mixed colors, according to the order in which they are printed. Red over black will look differently from black over red. So also some colors over others will produce a third far different from the two originals. Thus blacks may be produced by a mixture of dark reds with dark greens or blues. They are not true blacks, but will answer closely enough. The blank spaces which in ordinary printing are left in white are in lithography given a blue for the sky or the water, or a green for the trees, and not alone the typical green or blue, but that tint which the eye reveals to us when modified by the atmosphere and the distance. It does not make outlines so sharply or so brightly, but the masses of color are truer to nature. In chromolithography it is first necessary to make a design of the exact size upon one stone, although it does not need to be finished up. This is made ready after the usual manner of lithography, and is called a keystone. When complete, impressions are taken upon dry paper, and the ink thus received is again placed upon as many stones as the chromo is to have colors. The keystone must be dry before the impression is taken, so as to diminish the chances of expansion or contraction of the paper, and these impressions should be laid down upon the other stones as quickly as possible for the same reason. They are previously powdered with red chalk so that they can be more distinctly seen. The artist then completes his work upon each stone, and gets them ready for printing. Bronze or gold is usually printed first, as it would be very difficult to get the other inks so dry that they would not take some of the bronze when that was finally applied. With regard to the other colors, there are differences of opinion as to the order. Transparent colors come after opaque colors, but the general management of them depends upon taste, as displayed in that particular work. On work other than imitation of oil or water-color paintings these colors are somewhat conventionalized. For instance, one tint of green will generally represent grass and trees, both near and in the distance. But a dull tint under the green, something used elsewhere in the chromolithograph, will show the distant trees, and the same tint may lower the blue of the sky when sunshine is not visible. Six or seven colors will show a landscape very well indeed. Ten or twelve are the number in ordinary good work, but from twenty to forty are sometimes employed. In cards and ordinary work the designs are so made that if there are some faults in registering they are not apparent, overlapping easily, or separating in such a way that the mistake is not quickly perceived. One authority gives it as a rule that the order should be bronzes, blues, reds, yellows and the outline or finishing colors. It is a great waste of labor to have the same color go on twice, and it is also a mistake to use separate colors for chocolate, browns, russets and sage greens, for these, or an approximation, can usually be obtained by over-printing. It is of the highest importance to have an exact register. The paper should be well calendered, or otherwise it will expand in the press. The most common method is to have marks at the edge of the stone or at certain places on the stone, so that the sheet can be laid down accurately; but this presupposes perfectly square paper and of the same size. Points are also used, but there are difficulties incident to fastening them in the stone. It is very necessary to have the press-room kept at the same temperature day after day, and so far as possible with the same moisture. Each color should be well dried before the next printing. Setting-off can be prevented by powdered magnesia, chalk or flour, but this injures the brilliancy of the colors. Where great softness is required in a landscape it may be necessary to print some tint over the whole, although occasionally omitting a part. If needed to give an Indian-summer appearance a warm tint is used; a gray day in winter, a bluish tint. Nearly all the fine work is printed dry. The ink is repelled from the parts of the stone which are not to be printed by the merest film of moisture, so that the portion of water taken up by the sheet is very slight, and it is practically dry as soon as printed.

Photolithography has been used considerably of late, but much of its value has been taken away by process engravings in relief. See PHOTOLITHOGRAPHY. This art is used also in the reproduction of engravings and music, the theory being that already given, but with some changes in details. It can imitate steel and copperplate work with great accuracy.

For laves or washes on stone and for a light ink, which shall be more penetrating than other ink, special preparations are made. Special inks are largely made in lithographic establishments, and it is a practice to mix the inks purchased from the ink manufacturer. A special ink is furnished to business men who wish to write circulars and have them appear as if autographs.

The art of lithography being chemical, and only incidentally mechanical, is filled with difficulties in procedure. It requires long attention, great practice, and a thorough acquaintance with the minutiæ of the calling to attain distinction. Each process is still subject to experiment and improvement.

Lithographic printing is now largely employed in all parts of the world. It gives a much cheaper method of production on most colored work than typography; it is softer and more pleasing when done on a large scale than wood-engraving; it admits with ease of the introduction of curved and fanciful lines and of pictures, and when intended to be artistic rises to a very high pitch of excellence. Its defect is an inability to make fine lines as distinctly as other processes, and more or less graining is nearly always visible on black work. It is not so well adapted for work on a small scale as that on a larger. The growth of the art in the United States has been great. There were 53 establishments in this line of work in 1860, employing 786 persons and $445,250 capital. Two establishments were found each in Massachusetts and Connecticut; 23 in Pennsylvania and New York each; and one each in Ohio, Indiana and Missouri. In 1880 there were, according to the census, 167 establishments, giving employment to 4,332 persons, aggregating wages amounting to $2,307,302, spending $2,755,264 for material, and producing work valued at $6,912,338. It is supposed by an expert that there were in 1890 (the census figures not being available) about 700 lithographic establishments in the Union, running 4,500 steam-presses and 5,000 hand-presses, and employing 8,000 persons directly in the trade. Material to the extent of $6,000,000 was employed, and work turned out amounting in the aggregate to about $20,000,000. The chief centres are New York, Chicago, Boston, Philadelphia, Cincinnati and St. Louis.

A number of supply houses for lithographic materials exist in the United States, and several firms manufacture presses. Few letter-press printers have a lithographic annex in this country, although most lithographers are compelled to keep a little type on hand. There are many subdivisions among the workers, and the tendency is more and more to make each a trade, the man employed at one knowing nothing of other work. As classified by H. T. Koerner, secretary of the National Lithographers' Association, these divisions are artists' foreman, artists, provers and provers' assistants, transferrers and transferrers' assistants, power-press printers, power-press feeders and power-press assistants, stone grinders and grainers, ink-grinders, drying-room help and stock-room help, paper handlers and cutters. The jobs produced are classified as commercial work, show-cards, Christmas cards and novelties, chromos, theatrical work, advertising cards, common color work, cigar labels, wine and liquor labels, spool labels, music work, business and visiting cards, show-cards on tin and glass, lichtdruck, show-cards on zinc and iron, maps and charts, beer show-cards, printing from zinc and embossed work. Lithography is used in conjunction with typography in many ways, notably in stock certificates and evidences of ownership in incorporated companies. When a showy design is necessary, which includes in addition much straightforward lettering, it is frequently well to print the ornamental part first by lithography and then the words by typography. Specialties are very common to lithographers. Many confine themselves to one branch of work. Lately the label and show-card printers have united in one corporation, thus guarding against excessive competition in their line. The most prominent members of the trade have also united in the National Association of Lithographers. The society was formed on October 5, 1888, with Julius Bien of New York as president, and H. T. Koerner of Buffalo as secretary and treasurer. The objects are to cultivate friendly intercourse among members, to prevent disastrous and dangerous competition, to seek for remedies for the evils which beset the trade, and to study the improvement of the art. Since this time it has regularly held an annual meeting, each one being of value and profit. There is also a society of the journeymen entitled the Lithographers' Protective and Insurance Association of the United States and Canada. The hours of labor in the trade are fifty-three.

ANDREW LITTLE.

Lithophine.—An American preparation for preserving drawings and writing on stone.

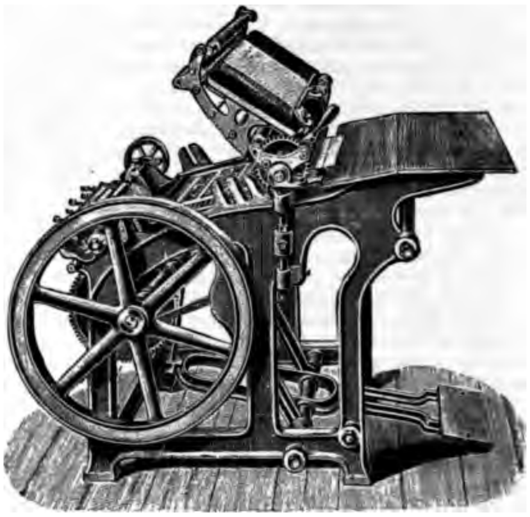
Lithotint.—An etching process executed on lithographic stones.

Little, Andrew, a type-founder of New York, was born in that city on September 22, 1829. He was educated in the public schools, and in the year 1841 entered the type-foundry of John T. White, first in the manufacturing department, and then being transferred to the wareroom. He continued there with Mr. White and his successors, White & Co. and Charles T. White & Co., until January, 1861, when he became a partner, under the firm-name of Farmer, Little & Co., remaining in continuous active business until the spring of 1892, when he sold his interest to his partners, after having been more than fifty years in the same establishment. He is an honorary member of the New York Typothetæ.

Little, Joseph J., a printer of New York, was born in the city of Bristol, England, on June 5, 1841. He came to the United States with his parents in 1846, and was educated in the district school in Morris, Otsego County, N. Y., and there also he served his apprenticeship as a printer, beginning in his fourteenth year. Four years later he entered a New York office to complete his trade. During the war he served in the army in all of the grades from private to first lieutenant. After the close of the war he entered upon business for himself, which, under the title of J. J. Little & Co., is still continued. It has been singularly successful. He was an early member of the New York Typothetæ, and has frequently been a delegate to the meetings of the United Typothetæ. He is colonel of the Seventy-first Regiment Veteran Association, president of the Society of Mechanics and Tradesmen, and a member of Congress, having been elected to the latter position in 1890.

Little Wonder.—A small jobbing platen machine, made by Messrs. Powell in England.

Live Matter.—Matter which has not yet been printed, and is therefore likely to be called for. On daily papers preparations must be made for the storage of this matter, which is sometimes very great in amount, as a newspaper of the first class invariably sets more type than can be used, and some articles are prepared several days or weeks before they are published. Matter after being once printed may be called for again, and some matter is repeated day after day, such as advertisements. All these are live.


LITTLE WONDER MACHINE.

Livraison (Fr.).—A part of a book, thus divided for delivery.

Livre (Fr.).—A book.

Llamada (Sp.).—A sign or figure which calls attention to a side or foot note; reference.

Llave Inglesa (Sp.).—A monkey-wrench (literally "English key").

JOSEPH J. LITTLE.

Loan Paper.—A paper of hard, thin and tough texture, used for documents and debenture forms.

Lock Up.—Fastening up tightly the quoins around a form by means of the mallet and the shooting-stick. See LOCKING UP.

Lock-Up Chases.—Special chases made in order to dispense with large quantities of furniture necessary to fill up spare room in forms or on the press.

Lock-Up Iron.—The iron stick used for tightening up forms as they stand instead of laying them up.—*Jacobi.* This phrase is unknown in America.

Locking Up.—Tightening up a form by means of quoins or screws. This must be done with care. The matter must be on its feet and firmly closed up against e or top of the chase, or against the bars of the each page or column being equal in length, and ly justified. The furniture being placed in the ive places the quoins are added and tightened as possible with the fingers. After planing down the up begins. First the quoins at the bottom are up slightly, and then those at the side, repeating ntil the page or pages are thoroughly secured, the form may again be planed down slightly. l difficulties may be pointed out. If the chase is nd the form is large the centre of the page will opposite to the quoining. In this case the force principally be applied to those quoins which are the corners, allowing those against the middle ess tightly locked up. Type is sometimes loose the inside column of a page. In this case, and generally, put a thin reglet next to the chase, as its the type at its side to slip more freely. Joined rules between ordinary reading matter will some- atch the matter and prevent it from being driven n this case, after tightening the side somewhat, p firmly from the foot, and then complete at the A broadside having a bulge on the thin part of se can be remedied by turning the chase around ptying the matter against the thick parts, putting e and foot stick against the narrow portions, where king up can be done. In every form allowance e made for engravings, stereotype or electrotype or solid metal blocks. They will not yield as as type, and consequently must be allowed for. should only have a very gentle bevel. It is better he thick end of the stick rest against the chase or r than to leave it unsupported. The stick should rom one page to another in the same quarter, in- f having two or four little foot-sticks at the bot- Forms should be tested as to squareness and in to lifting before being taken from the stone.

king-Up Apparatus.—Applied to the various f patent fastenings, such as screws or iron wedges. i.

king-Up Galleys.—Galleys so made that when tter is emptied upon them they can be locked up ontrivances which belong to the galleys, and do e to be taken to them.

kwood, Howard, a printer and publisher of ork, was born at White Plains, Westchester , N. Y., on March 9, 1846. He was the son of Munson I. Lockwood, and was a lineal descend- Robert Lockwood, first of the name in the United an emigrant from England in 1630, who settled ertown, Mass. In the Colonial and Revolution- rs the descendants of Robert Lockwood took an art, twenty-three of them having gallantly fought former conflict and nearly two hundred of them in ter. On his mother's side Howard Lockwood was ded from Nicholas Delaplaine, a distinguished Hu- , who came to America and settled on Manhattan where he died in 1790. Mr. Lockwood went to ork city in 1865, securing employment in a paper use in Duane street. He soon acquired a thorough dge of the paper business and an understanding scope, extent and processes of paper manufacture. ng that a newspaper in that interest was necessary blished the Paper Trade Journal in the spring of nd from it soon sprang the American Stationer. he established the American Mail and Export , and in 1885 started the American Bookmaker. he began the publication of Lockwood's Directory Paper and Stationery Trades, which is a standard . He also engaged in the publication of various of technical interest, and undertook the present the American Dictionary of Printing and Book- , in which he was greatly interested and to the of which he gave his personal care and attention. years after launching the Paper Trade Journal, finding that the exigencies of his business had largely increased, he determined to do his own printing and set up a printing-office, which has since grown to large proportions. In 1886 he formed a copartnership with William Pinkney Hamilton, under the firm-name of Howard Lockwood & Co. Mr. Lockwood was active in the formation of the Typothetæ in New York in 1883, and when a general convention of the trade was called at Chicago in 1887 he attended it on behalf of the New York organization in conjunction with William C. Martin and R. Harmer Smith. Having had much experience in societies he formulated for it a constitution which was adopted by the convention, and the organization assumed the title of the United Typothetæ of America. He was elected the chairman of its executive committee, and was chosen to the same position at each of the two succeeding annual meetings, and much of the strength of the society to-day is due to the exertions he then put forth. He was a delegate to every meeting after the first except that at Boston, when he was absent from the country. He died very suddenly on November 4, 1892.

HOWARD LOCKWOOD.

Loco.—A Latin word used by bibliographers to indicate the place where a book was printed. Sine loco, without place, is a statement that the place of printing or publication is not known.

Logotypes.—Two or more letters, or sometimes words, cast in one piece. It has long been thought by some printers that a selection of the most used letters, cast together, would do much to facilitate speed in composition. Lord Stanhope prepared a series for use, and his example was later followed by Tobit, a New York printer, and still later by a Chicago foundry. The compound characters of Lord Stanhope were th, in, an, re, se, to, of, on. They occur very frequently, as will appear in the following extract, the compounds being Italicized:

> "M*an*y gentlemen who write for *th*e p*re*ss fall *into an* error *th*at appears *incon*sistent even wi*th* comm*on reason*-*ing*—*th*e wor*se* *th*e m*an*uscript is written *th*e mo*re* likely *th*e work is *to* be cor*re*ctly pri*n*ted; for, say *th*ey, *th*e mo*re* difficulty *th*e pri*n*ter meets wi*th* *in* *re*ad*in*g it *th*e mo*re* pa*in*s he is obliged *to* take *to* underst*an*d *th*e subject, *an*d *of* cour*se* he will pri*n*t it mo*re* accurately *th*an if he could pass it over *in* a slovenly m*an*ner."

These compounds were never given a fair trial. Tobit, on the contrary, used his logotypes for over twenty years, and always maintained that he made a saving by them. The difficulty in their use consists in dividing the boxes, getting letters out of them easily and remembering their location. It is the habit of most ship-news compositors to have a savings-galley upon which they put the words which are constantly occurring, as brig, master, in ballast, and so on, but workmen unused to these galleys derive very little benefit from them. It requires long practice to remember the compounds at the instant they are to be used and to stop taking the letters out of the case one by one. No printer, however, has any difficulty in remembering the ordinary logotypes fi, fl, and so on.

London.—The chief city of the civilized globe, and the capital of the British empire. It has always been the great printing centre of English-speaking people. In what is legally called the city of Westminster, but which is generally known to the world as London, Caxton began printing in his native tongue in 1477, and here he was followed by Wynkyn de Worde and others; but in the city of London the first printers were John Lettou and William Machlinea, who are supposed by their names to have been foreigners. They began in 1480 near All Hallows Church, and continued until 1483. Their letter was a very coarse Gothic, more rude than Caxton's. Wynkyn de Worde had a printing-house in Fleet street, at the sign of the Sun, in 1495, probably carrying on business there and in Westminster for some time. He continued until 1533. Richard Pynson, another of Caxton's workmen, began at Temple Bar. He died before 1529, when he was succeeded by Thomas Berthelet as king's printer. Julian Notary was at Westminster in 1500, having learned the art in France. William Faques, Henry Pepwell, John Skot, Thomas Godfray, John Rastell, Robert and William Copland, John Butler, Robert Wyer and Robert Redman each practiced the art before 1525. Among the more prominent of those who were in the trade before 1600 were William Rastell, Richard Grafton, Edward Whitchurch, Michael Lobley, Reynold Wolfe, John Day, Richard Jugge, William Seres, Hugh Singleton, Robert Crowley, John Cawood, William Norton, Henry Bynneman, Thomas Vautrollier, Christopher and Robert Barker, John Wolfe, Roger Ward, John Windet and John Norton. Little printing was done in England before 1600 elsewhere than in London, except by those who issued defamatory or schismatic books. The establishments in the city were small, and little is known about the career of most of the printers. Neither was their work excellent, compared with the contemporary productions of France, Italy and the Low Countries.

The methods of printing in England were settled by the time that William and Mary began to reign. Before that day typography had very few settled rules, but the art was at that time divided into different occupations, and the workmen were attaining the skill which accompanies close attention to a single branch. Moxon, in his Mechanick Exercises, describes each of the subsidiary arts, all much more imperfect than now, but still respectably executed. The division between booksellers and printers became more marked, many of the latter never publishing at all. Capital was accumulated and type-founding was better done, the people read more largely and many printers were prosperous. The extreme rigidity of the laws relating to printing had been relaxed, and the business could be conducted with comparative freedom, not perhaps as easily as that of a shoemaker or a draper, but still being a great change from conditions under the Star Chamber. The earliest statute relative to printing was in 1483, allowing free trade in all printed matter imported from abroad. This act was repealed in 1533, as there were then within the realm a great number of "cunning and expert" persons who were employed in this science or craft. In 1556 the Stationers' Company was chartered, the term including booksellers, printers, bookbinders, publishers and type-founders. A brotherhood of stationers, consisting of writers of text letter, limners of books, and afterwards including printers, had existed from 1403. A lawsuit under Star Chamber authority reveals the fact that in 1582 master printers gave out a portion of their work to be done by journeymen at the houses of the latter, as shirts are now made by sewing-women. The journeymen had type of their own, with which they composed books, and as soon as enough pages were set to make a form they were taken to the master printer's house, where they were imposed and worked off, the journeymen having no presses. In 1582 there were twenty-two printing-houses in London, eight or ten sufficing for the remainder of the kingdom and for Scotland. This might indicate, masters and men, sixty to eighty printers in the city. In 1586 a very sweeping enactment was made by the Star Chamber, limiting the presses and printers to the number then existing. A return of the next year shows twenty-five printers, with fifty-three presses. In 1635 the journeymen printers presented a petition concerning certain abuses which they desired to have rectified. Up to this time, and long after, workmen were generally quartered in the houses of the masters, and the number of apprentices was large. In 1640 the Long Parliament assembled, and with it fell all Star Chamber rules, although in 1643 an attempt was made to curtail the liberty of the press. These and other acts failed to accomplish their objects; presses were multiplied, and when Charles II. ascended the throne in 1660 there were sixty master printers. The enactments made during the reign of Charles, which were very severe, were ineffectual, and in 1693 the law was no longer obeyed where it had been unchanged. Before that time there were seventy printing-houses and a hundred and fifty apprentices. In 1724 there were seventy-five printers in London and twenty-eight in the provinces. There were eighteen newspapers. No law was passed at a later date than those mentioned for limiting the number of printers or regulating their business except in 1799, but the provisions of that law were not enforced. In 1825 there were in the British metropolis 304 printers, nine letter-founders, seven iron press-makers, ten printers' joiners, seven printing-ink makers, six printers' smiths, three composition makers, nine designers, nineteen wood-engravers and six brass-rule cutters.

Improvements in the art began at the opening of the eighteenth century. The work done under the Stuarts was very bad. The extension of business, the competition of employers and the discrimination of booksellers resulted in better books and better small work. "Books," remarks Reed, "came to be legible, paper became white, ink black, and presswork respectable. Caslon came in on the tide of the revival," the types used on good work being Dutch. With the growth of the British empire, the increase of population and education, and the greater diversification of books, much enterprise was shown by publishers, and printers found their facilities taxed to meet the requirements. The first great step forward came through the example at Birmingham of Baskerville, who printed as well as the art would then allow, paper, ink and type being of the highest quality, and the sheets being subsequently hot-pressed; but he had been preceded by Bowyer, Watts and others of first-rate ability. It was for Watts that Franklin wrought as a journeyman. Other eminent houses which began in the last century were those of Hughs, continued by the Hansards, and Strahan, Franklin's friend, continued as Eyre & Spottiswoode. Bensley and Bulmer represented fine work rather than quantity. Richardson the novelist was an eminent printer. The volume, however, of the outturn of the trade has increased with great rapidity. Parliamentary work is twenty or thirty times as large as it was a century ago; job printing has been almost entirely the creation of the last half century; and the introduction of the power-press has lessened the cost of all work and greatly increased the consumption.

The first improvement in the art taken up by London and carried to its success was the iron hand-press. Lord Stanhope saw that the old contrivance must be made stronger and better, and before 1805 a number of his new presses were in use. Stereotyping, reinvented by the same public-spirited nobleman, was in operation as

s 1802, but it progressed slowly. When Bruce
England in 1812 he found only two firms using
thod of insuring correctness, and in 1818 an Eng-
veler in the United States speaks of the execution
ks in New York and Philadelphia by stereotyping
agnitude greater than any which had been up to
ne attempted in the United Kingdom. The ma-
ress printed a few sheets in 1810, but it was not
814 that it was successfully employed day after
The first machine of König was immediately im-
, and in various forms became common in Eng-
lthough the hand-press is still employed to an
which seems wonderful to Americans. The com-
n roller, a necessity for good presswork, is just
as old as machine-presses. In the early part of
tury paper-making, instead of being hand-work
was successfully attempted by machinery, and
soon became lower in price and larger in dimen-

Bookbinding in cloth was also an invention of
rd decade of the century. These causes, taken
rently, the cheapness of paper, the invention of
yping, the printing upon machines, and the ease
hich cloth binding could be executed, effected a
te revolution in the trade. Books could be pur-
by those who were not rich, and popular editions
common. The peculiar facilities which London
enabled her for a long time to have almost the
monopoly of the bookselling trade. Edinburgh
r only competitor in the British Islands, and the
f New York, Philadelphia and Boston on this
American opposition, however, only lessened the
as nearly all important works, except text-books
se on medicine and law and American history,
rst brought out in London. Pirating was also
xtensively in Belgium and Germany. Another
of printing which has become very important is
newspapers and magazines. The number of these
ast century was very limited, and their typograph-
ds were small. A companionship of half a dozen
epared a daily paper for press, and a magazine or
newspaper could be set by one man. Four small
was the size of the Times until the conclusion of
poleonic wars; a double sheet of the new magni-
as not seen for many years after, and its present
as only existed since 1840. The number of maga-
nd newspapers in 1890 was about one thousand,
ly employing upwards of three thousand compos-
r a greater number than the entire English-speak-
rld did a hundred years ago. Accessory to these
nes, newspapers and books has grown a multitude
r occupations, each employing many persons. In
nson's day he reported the proceedings in Parlia-
y sheer dint of memory, and Woodfall later per-
the same feat. Shorthand is now a very common
lishment in London. Wood-engraving and proc-
raving require many workmen. The production
els in Great Britain, it is understood, employs as
nearly the entire time of three hundred persons.
books are chiefly published in London. Many
s are also occupied there upon works of research,
ch the British Museum gives unequaled facilities.
le of printed work is very great, and there are
thousands of men engaged in purchasing, selling
livering books and periodicals.

quality of the work thus turned out is on the
respectable. Large and wealthy firms, like Mur-
sist on good work, and the newspapers are very
ly printed, so far as proof-reading is concerned.
printing-offices have much larger capital than
onding American houses, owing to the habit of
ing credit to responsible customers, and to their
of sending books to press in type instead of elec-
ing. In America most firms need only have float-
pital enough to pay two months' expenses; in
d difficulty would be found in doing business
ly with twice that amount. From the habit of
setting up books to go on the press without making plates, and of allowing detention of proofs for a long time, much more type is necessary than is found to be the case in New York. A third drawback which London offices experience is in their location. Old dwelling-houses are altered over for use in printing, and half a dozen or a dozen may thus be employed by a single firm. As a result, really efficient supervision is impossible, and heating, lighting and sanitary conveniences are much neglected. London offices are not liberally provided with little helps to the compositor, such as cabinets, rule-twisters, brass-cutters and labor-saving rule, metal furniture and patent quoins. By ingenuity the compositor can supply any deficiency. The chief defect in London work, looking at it from an American standpoint, is the heaviness of the printed page. There is a strong impression, indenting deeply; the page is charged with ink, and the wood-cuts are flat and either gray or muddy. Presses are not built so firmly as ours, and perfecting presses are very largely used. As a result, the impression is not as clear as in the United States, and the second side is darker than the first, some offset always being visible. A very marked inferiority is noticeable in the printing of wood-cuts and in the execution of job-work. Much of the latter is due to the fact that proper materials are not supplied, the type being very plain, and the former is probably partly due to the reason given before, the lack of rigidity in the presses, but more to the unwillingness of employers to give time for make-ready and to the lack of experienced pressmen on this kind of work. Practically the English pressman has reached the highest figure he can attain at two pounds a week. He has therefore little inducement to learn how wood-cuts should be treated, as he receives no advance in pay.

Type-founding has always been practiced in London since the art began there, but it was not until 1597 that any mention was made of type-founding as a separate business. Before that date each printer cast his own type or bought it of some accommodating neighbor. In that year Benjamin Sympson appeared as a letter-founder. The Star Chamber in 1637 limited the number of founders to four, John Grismand, Thomas Wright, Arthur Nicholls and Alexander Fifield. Moxon became a founder fifty years later. None of the early founders were, however, producers of any work above the average, and letter-cutting was, as a whole, badly executed. Those printers who desired to produce really good work were compelled to get their type from Holland. English typography was relieved from this reproach by William Caslon, born in 1692, and beginning business in 1720. His faces immediately attracted attention, and after a few years the importation of Dutch type ceased. His successors and rivals were men of ability, and the Roman types cast in England have, since Caslon's day, been regarded as being as good as can possibly be obtained anywhere. Among those who were also prominent shortly after him were Thomas Cottrell, Joseph and Edmund Fry, Joseph Jackson, William Martin and Vincent Figgins. At the present day the business is carried on by eight or nine firms. A distinguishing feature of British type-founding is the number of Oriental and other foreign types which are made. Hand-casting was employed there on fonts of body type much longer than here. The variety of job faces shown by these founders is much less than would be exhibited by a corresponding number of American founders.

Lithography began to be used to some extent in 1820, and is still much employed in London on commercial work in comparison with the United States. Job-work in colors is more largely done by lithography there than here. Like the trade in the United States, London houses suffer on account of the better artistic education of German draughtsmen and the excellence and cheapness of lithographic work from the Continent. Press-building is a large business in London, all kinds of machines being manufactured there. More firms are engaged in this business in Great Britain than in the United States, although the total demand is not so great. As a result the firms are not so wealthy. English ink has had a high reputation for many years. Several ink manufacturers are located in the metropolis.

The principal part of the printing in London is done in the parish of Saint Bridget or Saint Bride. Fleet street is in this parish. Upon it dwelt Wynkyn de Worde, and here Richardson had his office. Hansard says that the number of those carrying on business in this parish almost defied enumeration, certainly eclipsing, in comparison, that of any other parish or circle of similar extent in England, or perhaps the world. Bradford, our first printer, did not, however, learn his trade in this parish, but outside of it, on Gracechurch street, and consequently New York and Philadelphia are not colonies of Saint Bride.

The London scale is the oldest in existence. Early in the last century compositors were paid 4d. a thousand ens for English, 3½d. for long primer, and 3¼d. for brevier, Edinburgh prices being at the same time 2½d. for brevier. The compositors brought the question of an increase before the masters of London in 1785, and after spending several months in consideration of the matter the latter decided to give the workmen an advance, ordinary work being 4½d., and determinate prices being given for other languages than English, but which had previously no settled ratio. In May, 1793, it was agreed to include in the measurement of the page the lines for heads and signatures. In November and December, 1800, a considerable advance was granted, amounting to three farthings on the thousand. In 1810 a distinction was made between leaded and solid works, and in 1816 a distinction was made between manuscript and reprint. The rate then was for leaded, including all between English and brevier, 5¾d. per thousand ens; minion 6d. and nonpareil 6¾d. Solid matter, between English and brevier, 6d.; minion 6¼d. and nonpareil 7d. Pearl, with or without leads, 8d. Foreign languages halfpenny advance. These figures have been advanced repeatedly since. According to Blades a change was made in 1847, another in 1866, and a third in 1872. A subsequent change was made in 1874.

The present scale, agreed upon at the beginning of 1891, provides for 38s. for fifty-four hours, an advance of 2s. Compositors receive and give two weeks' notice prior to terminating their engagements. Overtime is 3½d. per hour the first three hours, after that 4d. per hour until 12 midnight, when it is 5d. per hour. On Saturdays for the first three hours the price is 4d. an hour, after that 5d. an hour. Compositors working for more than three consecutive hours are to have half an hour for refreshment. Fractions of hours are paid for as complete hours. Sunday work is 8d. an hour extra, the men receiving in no case less than 3s. 4d. All this is in addition to the charge of 8¾d., which is what the weekly rates come to.

On piece-work English to brevier is now 7½d.; minion, 7¾d.; nonpareil, 8½d.; ruby, 9d.; pearl, 9½d., and diamond, 11½d. Exact reprints are three-quarters of a penny less. These are for solid works. Leaded are, English to brevier, 6¾d. per thousand; minion, 7d., and nonpareil, 7¾d. The London, Edinburgh and Glasgow scales, per thousand ens, are shown in the next column.

In Edinburgh, work set up from reprint, with unimportant alterations, is a halfpenny a thousand less, and this is the rate also in Glasgow. In London works in foreign languages, set in Roman, are about a penny higher than in English. English dictionaries are at the same rate when expressing only the meaning of words; 9d. when marked with pronunciation or accents. Grammars are 8½d. if in English; those in foreign languages or two languages, 9d.

For newspapers the present scale is the same as the old. Morning newspapers pay on minion and larger, 9d.; minion-nonpareil, 9½d.; emerald, 9½d.; nonpareil, 10d., and ruby, 10½d. Evening and weekly newspapers are a halfpenny less. The weekly scale is 38s. on weekly and monthly newspapers, but there are some workmen receiving 40s. and 42s.

The present Society of Compositors was organized at the beginning of the century. To a very considerable extent it controls the rate of wages in the metropolis, changes being made in joint meetings with a committee of the employers. The latest reports show a membership of about 7,400, as against 1,100 in 1848. This is rather over half the number of compositors in London, the non-society offices being numerous and some employing many men. An allowance is made to unemployed men, and another to those who are superannuated. In a recent year the sums appropriated were, for unemployed men, there being 1,555 recipients, £5,544; removals, £60; emigration, £150; superannuation, £1,095; funerals, £1,227; strike hands, £459; medical charities, £210; printing, £355; salaries, £541; library, £36. The hours of labor are fifty-four, having been reduced in 1872 from sixty. A movement is now in progress to reduce these hours to forty-eight. Prior to 1866 compositors worked sixty-three hours per week. When that was changed to sixty overtime was made rather less than 50 per cent. in advance of the general rate. Most of the job and book work, with the composition of weekly newspapers, is now done by week-work, or by hands who are on the "establishment," as it is called. Piece-work is less common than it was a few years ago. A late Blue Book shows that 74 per cent. of the compositors, bookbinders and pressmen lived in three rooms or more; 12 per cent. lived in two rooms; 11 per cent. lived in one room, and 3 per cent. in a part of a room. Their average earnings were $7.21 a week; their rent cost them $1.65 a week. Wages for foremen and superintendents are very low. Inquiry elicits the facts that the foreman of a small office, of from five to ten hands, will receive from £2 to £2 5s.; that the foreman of an office of fifty hands will get from £2 10s. to £3, and one of one hundred to one hundred and fifty men in one department £3 10s. to £4. Superintendents and managers receive from £4 to £6, this latter figure being very high, and not to be exceeded except in case of estates without skilled trustees, or where business is controlled by the superintendent. Proof-readers range from the established wages to twice that figure where great responsibility rests on them in a large office.

PRICES OF COMPOSITION IN THREE BRITISH CITIES.

	London.	Edinburgh.	Glasgow.
	Pence.	Pence.	Pence.
English to Brevier	7½	6½	7
Minion	7¾	6¾	7
Emerald to Nonpareil	8½	7	7¼
Ruby	9	7¼	7½
Pearl	9½	7½	7¾
Diamond	11½	8½	8¾
Gem	....	9	9¼
Brilliant	....	10	10¼

Besides the London Society of Compositors there are a dozen other unions among various branches of the trade, swelling the number of unionists to about ten thousand. Among them are nearly a thousand hand pressmen. The management of these societies is much more stable than that of the corresponding organizations in the United States, the same officers being continued for long terms. Opportunity is given for extended conference when any change is desired.

The workmen in London offices, Henry George informs us, are heavy drinkers, their customs not having changed since Franklin's days. Beer is used constantly. There is no allowance for lost time on the dailies, nor is bogus given out. The substitutes are called "grass" hands, and instead of taking their chances for work as they do here, there is a "first grass," "second grass," "third grass," and so on, these men taking work in order. The organization of men in the office is known as the "ship," a contraction of the word "companionship."

A society was formed in 1890 among the master printers called the Printing and Allied Trades Association. The members may be from any trade connected directly or indirectly with the printing, binding, publishing and paper-making interests. H. Vane Stowe is secretary. The other officers are an executive committee. This body conducted the negotiations with the workmen which resulted in the last advance in the scale of prices. There have been many notable men among recent London master printers, and their abilities and achievements in other lines than printing alone have been worthy of remark.

Long, George, an Englishman, who was taught his trade in London, but afterwards enlisted as a soldier and came out to Canada. He was stationed at Montreal for some time, but about 1804 bought his discharge and went to New York, where shortly after he began business for himself. He was a good classical scholar, and for a long time did most of the work in Greek, Latin and the modern languages. About 1820 he began to turn his attention more to bookselling, and continued this until his death in 1842.

Long Bar.—The same as Long Cross, or the bar which extends the length of the chase.

Long Case-Rack.—Tall case-racks, distinct from frame-racks. This definition is from Jacobi, but is not used in the United States.

Long Cross.—The bar which divides a chase the longest way.

Long Letters.—1. Accented letters with a horizontal stroke over them, as ā, to denote a long pronunciation of the vowel. The same mark is also used in old books to indicate a contraction or omission, and in this case it might be over any letter. A third use is to denote long syllables metrically, as contrasting with short ones. 2. Letters which fill the whole depth of the body, and are both ascending and descending, such in the Roman as Q and j, and in the Italic *f*.

Long Measures.—Type composed in wide measures. Any measure in bookwork beyond twenty-five or twenty-eight pica ems would generally be regarded as a long measure, but quarto books are sometimes set in measures twice as wide as this, and insurance policies three times as wide. From the great weight of the stick in these long measures it is not advisable to attempt to fill it before emptying. If in small type, and the measure exceeds fifty ems of the body used, it is well to take a stick of half the measure and make two lines out of one, placing them both in the right position on the galley. Small type in long measures is apt to burst in the centre. Long measures in large metal or wood type are generally set in wooden sticks, as such sticks are much lighter.

Long Numbers.—A large edition of a work, requiring many sheets to be printed.

Long Page.—A page longer than the space allotted by the gauge. It is sometimes unavoidable, but can generally be escaped by putting a little more spacing in the previous pages or by taking a little out. Frequently a paragraph can be run in or it can be divided into two. In cases where it is impossible to prevent a long page, that which faces it should be of the same length.

Long Primer.—A medium-sized kind of type, between bourgeois and small pica. By the point system it is known as ten points. It is half paragon in body, and twice pearl. About seven and a half lines make an inch. It is accounted one of the most useful types known, and probably exceeds all others in the quantity sold. It is the largest type in country newspapers and a favorite size for the body of books, and is much used for jobbing. Long primer in French is called petit Romain; in German, Corpus or Garmond; in Dutch, garmond, and in Italian, garamone.

This Line is set in Long Primer.

Long Pull.—A long pull is when the bar of the press requires to be brought close to the cheek or to its extreme to make a good impression.

Long S.—The old kind of s, thus, ſ, used in old-style or antique work. See S.

Long Takes.—Portions of copy given out to compositors in larger quantities than usual.

Long Twelves.—A plan of imposition whereby the pages in a duodecimo are laid down in two long rows of six pages.

Loose Bulk.—A bulk or table which can be removed from one place to another, and upon which type can be placed.

Loose Justifying.—Lines which are not spaced tightly enough.

Löschpapier (Ger.).—Blotting-paper.

Lossprechen (Ger.).—To discharge.

Lothian, George Baxter, a celebrated type-founder of New York city, one of the experimental pioneers in machine type-casting and type-rubbing, and also in the present method of kerning type. He was the son of Dr. Robert Lothian, of Scotland, who made an ineffectual attempt to establish a foundry in New York in 1806, but, failing, sold his material in 1810 to Binny & Ronaldson, of Philadelphia, and died shortly afterwards. The son, George B. Lothian, remained for some time with a bookseller in Philadelphia, where he became much interested in the theatre and appeared in public in a round of Scotch characters. Shortly afterwards he was employed by John Watts, who in 1813 produced the first stereotype in the United States; but Lothian's singularly irritable temper and license of speech led to a difficulty which resulted in his being committed to jail. He afterwards worked for Collins & Hanna as a stereotype finisher for about two years, leaving that employment to establish a type-foundry in Pittsburg, Pa. Failing in this undertaking, he returned to New York, where his material was purchased by D. & G. Bruce, who also furnished him with employment. This engagement he abandoned in order to study for the stage, but was compelled to relinquish that pursuit on account of his defective verbal memory, although he was otherwise admirably adapted for the theatrical profession. In 1822 he manufactured type for the Harpers and others, in partnership with Alfred Pell, but this connection was soon broken by a personal encounter. In 1829 he was again manufacturing successfully, and proposed a partnership with James Conner, a man of remarkable self-control; but in one of the preliminary conversations upon their affairs Lothian used such exasperating expressions that Conner broke off the arrangements and nearly pitched Lothian out of the window. The Harpers continued to employ him, bearing with the eccentricities of his temper on account of the excellence of his type, and Mr. Hagar also undertook a partnership with him in 1840; but this connection, the last attempted by Lothian, was ruptured in less than half a year. Domestic sorrow was added to Lothian's business misfortunes; his wife and children died, and in declining health his mind was seriously affected. He died in 1851, attended by a single female domestic. He left a handsome competency judiciously bequeathed.

Lottery Tickets once formed a very large portion of the work done by printers, but since lotteries have been forbidden by law in most of the States this work has sunk into unimportance. The tickets are now printed from stereotyped plates, some going through the operation three or four times to give the requisite colors. They are printed in sheets and are then cut. The figures which form the combinations are cast in plates.

Loudon, Samuel, an Irishman who settled in New York city several years before the Revolution, establishing himself as a ship-chandler. He bought a printing-office and material of Frederick Shober, a German, in 1775, and established a bookstore in Water street, near Old slip, and began a newspaper called the Packet. In it he maintained the popular side, and advocated resistance to Great Britain. In the summer of 1776 he removed to Fishkill, where he published his newspaper until the peace of 1783, when with the other Whigs he went back to New York. Shortly after his return the paper was changed from a weekly to a daily, being entitled in 1793 the Diary, or Loudon's Register. When the adoption of the Constitution was celebrated in New York on July 23, 1788, he was a marshal of the procession, which among other trades embraced all of the printers and bookbinders. Some time before the close of the century he removed to Middletown Point, N. J., where he died on February 24, 1813, aged eighty-six years.

Louisiana.—One of the Southern States, situated at the mouth of the Mississippi River. The first printing in the State was done in 1804 at New Orleans by Fontaine, who began a journal called Le Moniteur. The same year printing was executed in English by John Mowery, whose paper was entitled the Louisiana Gazette. As the city increased in size and population other newspapers were begun, and after 1850 much job printing was executed there, it having no rival within many miles. The price paid to the journeyman before the war was very high, reaching fifty cents a thousand for composition on daily papers, while the highest rate paid anywhere on the Atlantic coast was thirty-five cents. The cause of this was the danger to the health of men not acclimated. In 1810 there was one periodical in Louisiana; in 1840 there were 34; in 1850, 55; in 1860, 81; in 1870, 92, and in 1880, 112. In the last-mentioned year there were 13 dailies, and newspapers were issued in 59 towns. In 1890 there were 10 dailies and 142 other periodicals. There is little job printing done in any other city or town of the State than New Orleans, which exceeds all of the rest of the State combined in the magnitude of its operations.

Louisville.—This city, the principal one in Kentucky, has had a press ever since 1807, and possibly before. In that year a newspaper called the Farmer's Library was started. In 1818 a semi-weekly was issued, and in 1830 a daily. There were published there in 1890 five dailies and thirty-one other periodicals. Job printing to a large amount is also executed in this city.

JOHN LOVELL.

Lovell, John, for many years the leading Canadian printer, was born at Harbor Hill, in the county of Cork, Ireland, on August 4, 1810. The family emigrated to Montreal, Canada, in 1820, and three years later John Lovell obtained a place in the printing-office of Edward V. Sparahawk, but from 1827 he was with the Montreal Gazette. In 1832 he went to Quebec, but the cholera breaking out he returned to Montreal, being employed in the office of L'Ami du Peuple. In 1835 he bought that periodical, and has ever since been at the head of a printing-office. During the Canadian Rebellion in 1837 he took the part of the Government, enlisted, and was in several battles and skirmishes. For six months his office was closed and his workmen were discharged. For one of them he felt much sympathy, and allowed him to take some type and use it, previously exacting a pledge that he would print only translations from the English papers; but the workman betrayed his confidence and published inflammatory matter. As a consequence, martial law being in force, Mr. Lovell's office was seized, but was soon after restored. Since December, 1838, he has been continuously occupied as a printer and publisher. For a long time he was the only school-book publisher in Canada, and since 1842 he has been the publisher of the Montreal Directory. In the year 1871 he compiled and published the Dominion Directory, a volume of 2,565 pages in three columns in small type. Believing that there was an opportunity for competing in the trade of the United States, he began with others the establishment of a large printing-office at Rouse's Point, N. Y., but it failed after the expenditure of $200,000. He has lately issued a prospectus for a Gazetteer and History of Canada in eleven royal octavo volumes. Mr. Lovell is still actively at work every day, after spending sixty-nine years in a printing-office.

Low.—Type or other parts of a form which are lower than the remainder. As a consequence the rollers pass over them without giving them as much ink as the other parts, and the characters do not meet the surface of the cylinder as thoroughly as they should, thus making the impression imperfect. This difference is generally very slight, varying from the hundredth to the thousandth of an inch. The remedy is an underlay.

Low Case.—When the compositor has set nearly all of the letter out of his case.

Low in Line.—Letters which are lower than they should be in respect to others, thus: Alphabet.

Low Quadrats.—Quadrats of ordinary height, as distinguished from the high quadrats used in stereotyping and electrotyping.

Low to Paper.—Those type or engravings which are lower than the remainder of the form; type which is not as tall as usual.

Lower Boards.—The under or taking-off boards on a printing-machine.—*Jacobi.*

Lower Case.—The lower of the two shallow trays which contain printing-types. It comprises the common small alphabet, the points, spaces and quadrats and the figures, all of these in consequence being designated as lower-case sorts. Lower case is also used as a term in opposition to upper case, which means the capitals, and thus it refers to the small letters. The bulk of the compositor's work is done with the lower case, two or three letters a line being as much as he will ordinarily require from the upper case. See CASE and LAY OF THE CASE.

Lower-Case Sorts.—Letters belonging to the lower case of the pair; distinct from capitals or small capitals.

Lug.—When rollers are tacky or stick to the type they are said in England to lug.

Lye.—The preparation used for cleansing type after printing. It is a strong alkali made from ashes. Wood ashes are regarded as the best. In country offices where wood is abundant a water-tight barrel should be obtained and filled with ashes. Three or four holes are made with a gimlet close together at the bottom, and the barrel is tilted so that the lowest part of all is where these orifices are situated. Then a little water is poured in at the top of the barrel, which is renewed as fast as it soaks in or evaporates. A little wooden trough conveys the lye, where it finally trickles out, to the jar which is to contain the liquid. This is the cleanest and most satisfactory kind of lye known, but most printers are compelled to rely upon potash and concentrated lye. Jars containing this liquid should not be allowed to remain uncovered, nor should the lye after use and after being saturated with ink be thrown back into the lye-jar. A good stiff brush is necessary for the surface of the type, and an abundance of lye. When the type are washed enough the lye should be completely taken off by water, the rinsing being very thorough. If much lye is left on the type it will make the latter feel slippery to the fingers and they will very speedily become sore. Formerly on daily newspapers hot lye was used.

Lye-Brush.—A brush used for washing the face of galleys and forms. It is a strong, stiff brush.

Lye-Jars.—Earthenware articles for storing lye.

Lye-Trough.—The lye-trough is square and shallow, lined with lead, and its upper edge is sometimes bound with iron to preserve it from injury, which would otherwise arise from concussion when the form is lifted into it. It is suspended on a frame by two centres.

Lyons.—One of the largest cities of France. It has from the beginning of printing shown great activity in printing and publishing. The art was established there in 1473, although there is some dispute as to the exact time. The original printer was Guillaume Regis or Le Roi, who was taken thither by Barthélemy Buyer, a member of a rich and esteemed family. Gaspard Trechsel printed in 1487 the first volume of the Works of St. Augustine. This well-taught printer had for his corrector Josse Badius, to whom he gave in marriage his daughter Thalia. Trechsel printed the books of Servetus, who afterwards was burned alive in Geneva by the followers of Calvin. In 1532 the first part of Rabelais's Gargantua appeared. Dolet published a complete edition in 1542. This learned and unfortunate printer wrote two works bearing particularly upon points of interest to the trade. One was on French Punctuation, and the other was upon French Accents. Among other famous printers in Lyons were Jean de Tournes, Guillaume Roville and François and Sébastien Gryphius. The merit of the latter, according to Gesner, was that he made a good choice of the books printed; he issued many editions; his characters were beautiful and his proof-reading exact. Frellon, Junte and Cardon were also of this city. The Anissons printed an edition of the fathers of the church in Greek and Latin, and Du Cange's Glossary. Anisson Duperron was the director of the French government printing-office, but lost his life on the scaffold in 1794. Since the beginning of the century there have been many skillful printers in Lyons, and a large business is now carried on there.

M

M THE thirteenth letter of the English alphabet, is the thickest of the lower-case letters and one of the thickest capital letters. In making a new face of type, when the punches are to be engraved, the letter m is the first cut, and gives the key to those which follow. It is of frequent occurrence, yet is much exceeded in this respect by the vowels and some of the consonants. In Latin it signifies a thousand; the original designation of this number was double D (CIↃ), which gradually became an M. MM. means two thousand, and with a dash over it M denotes a million. In numismatics M stands for a great variety of words. M. D. signifies doctor of medicine; A. M., year of the world, or master of arts; MS., manuscript, and MSS., manuscripts. D. O. M. signifies to the best and greatest God (Deo optimo maximo). M. stands for noon; A. M. for before noon, and P. M. for afternoon. In medicine it signifies to mix; also manipulus, a handful. In French it means Monsieur, and MM. means Messieurs. Mc signifies Mac, and when abbreviated still further this is done with an inverted comma and not with an apostrophe, as in M'Whorter. Md. is Maryland; Mo., Missouri; Miss., Mississippi, and Mass., Massachusetts.

M Paper.—Paper which is not up to the highest standard of the manufacturer, and which he prefers to sell under a general title as M paper. The term probably denoted in its origin an imperfect paper, and still implies inferiority, which, however, is generally so slight that it can be noticed only by experts.

William S. McClevey.

McClevey, William S., secretary-treasurer of the International Typographical Union, was born in Chicago on March 23, 1859. He was the seventh in a family of fifteen children, and was given an excellent public-school education, afterwards entering a printing-office. In 1887 he was selected by the printers of Chicago to represent them at the meeting of the International Union held at Kansas City, and was chosen by this body to act as secretary-treasurer for part of a term. The previous officer had left his accounts in confusion, but Mr. McClevey succeeded in extracting order from them. At each succeeding annual convention he has been rechosen without opposition, the session of 1888 having changed the law which required an incumbent to be a delegate in order to be eligible for re-election. He is secretary of the board of trustees of the Childs-Drexel Home for Union Printers, and has been a member of that board since its organization.

McCreery, John, an English printer who wrote a poem entitled the Press, which was very elegantly printed. The verse was of a high order. He was born in Ireland, carried on a printing-office in Liverpool and afterwards in London, and died in the latter city in the year 1832.

McDevitt, Charles, a veteran printer of New York, died in that city on August 30, 1876, aged seventy-eight. He served his time with George F. Hopkins, and was foreman of Morris & Willis's Mirror, and afterwards of the Daily Mirror. At the time of his death he was the foreman of the Ledger. He had an excellent memory, spoke well, and printed many reminiscences. He was one of the oldest members of the Typographical Society.

John R. McFetridge.

McFetridge, John R., a printer of Philadelphia, where he is a member of the firm of Burk & McFetridge, was born in that city. He entered the employment of Jesper Harding, a well-known printer and publisher, when only eighteen years of age, and filled an important position with the house until 1877, when with William M. Burk he purchased the business from William W. Harding, who had succeeded his father, Jesper Harding, in trade. This business was a long-established one. It began about the year 1810. At this establishment was printed the Pennsylvania Inquirer, which subsequently became the Philadelphia Inquirer, and is still published. The firm of Burk & McFetridge at once acquired a good footing, and its business ever since has been very successful. It includes lithography. Mr. McFetridge has repeatedly been a delegate to meetings of the United Typothetæ, and is now one of its vice-presidents and president of the Typothetæ of Philadelphia, of which he was one of the founders. In 1881 he was elected master of Potter Lodge No. 441, F. A. M., and has ever since been treasurer. He is a member of several other masonic bodies, and was eminent commander of the Knights Templar in 1888 and 1889. He is also a member of many other organizations, including among them the Philadelphia Bourse, in which he is a director.

Machina da Stampa (Ital.).—A printing-machine.

Machine (Fr.).—A power-press, a press. In England the same term is used, sometimes as machine-press. In the United States the general term is press, it being distinguished by the prefix power from the hand-press.

Machine Boys.—The lads who lay on, take off and job about generally in the machine department.—*Jacobi*. In America, the feeders.

Machine Men.—The workmen or minders who attend the machines.—*Jacobi*.

Machine Minder.—The skilled workman who is responsible for the care of the machine.—*Jacobi*. In America, the pressman.

Machine Paper.—Paper other than that made by hand.—*Jacobi*.

Machine Points.—Special points which are used in the machine department, and distinct from press points. —*Jacobi*.

Machine Reviser.—In England, a proof-reader or editor who examines a newspaper carefully after it has been put to press, but before the edition is worked, to see if anything is wrong.

Machine Rollers.—The various rollers in use for machine printing generally, such as inkers, vibrators, wavers, &c.—*Jacobi*.

Machine Room (or **Department**).—That portion of a printing-office occupied by the machines.—*Jacobi*. In America, the pressroom.

Machine Tapes.—The narrow tapes which guide and carry the sheets from the cylinders in printing.—*Jacobi*.

Machine Work.—A term for work executed by machine as distinct from that done on a hand-press.

Machines à Couper (Fr.).—Cutting-machines.

Machines à Imprimer (Fr.).—Printing-machines; printing-presses.

McKechnie, Robert, ex-president of the National Typographical Union, is a native of Armagh, Ireland, where he was born on October 20, 1834. His father was a Scotchman and a veteran soldier. Robert was educated at the Academical Institute, Belfast, and learned his trade in the office of the Belfast Whig. He arrived in New York in January, 1854. In 1855 he went to Nashville to work in the Methodist Book Concern, just begun there, but returned shortly to New York. On April 19, 1861, he enlisted in the Hawkins Zouaves, and was in service for a couple of years, in the meantime being promoted to first lieutenant. He was in a number of battles, including among them Antietam and South Mountain. When the term of service of his regiment expired he went back to New York. In 1864 there was a strike in New York, very disastrous to the workmen, the scale afterwards being suspended, and the union almost destroyed. In 1866 he was elected president of Union No. 6. It was with difficulty a quorum could be obtained, and there were only 204 members in good standing, although there were probably four thousand compositors in the city. By March, 1867, his efforts had resulted in increasing the membership to 452. He was re-elected in that year; the city was districted, and proselyting was done, so that in the following December there were 1,079 on the rolls. During that year a new scale was adopted, the highest ever paid in New York. He endeavored while holding this office to use organized labor in a political way, so that unfriendly newspapers favoring a certain party should be forced to make concessions. It proved a failure in the case of the World, but the theory was afterwards partially carried through. In 1868 he was elected president of the national body, succeeding John H. Oberly. The most striking event of his administration was the issue of the "amnesty proclamation," by which all persons who had been guilty of working under prices or had otherwise been under the ban of unions could be restored to membership by submission. See INTERNATIONAL TYPOGRAPHICAL UNION. This was harshly criticised by some, but was believed by most unionists to have been on the whole useful. In 1872 he was elected for the third time president of the New York society. He was then foreman of the World. Since his retirement from that position he has been on the Herald. After the nomination of Mr. Blaine for the Presidency in 1884 he went with Charles B. Smith to visit him, hoping that enough pressure could be applied from Augusta to induce the New York Tribune to become a union paper. In this, however, they failed, but the effort, continued until 1892, in the end was successful.

ROBERT MCKECHNIE.

MacKellar, Thomas, a type-founder of Philadelphia, was born in New York city on August 12, 1812. At the age of fourteen he began working in the office of a New York weekly paper, the Spy, but soon after entered the employment of Harper & Brothers. His superior accuracy led to his employment as a proof-reader at the age of sixteen. When about twenty years of age he accepted an offer to go to Philadelphia as the foreman of the printing-office connected with the Johnson stereotype foundry. He continued in this position, also managing many other details, until 1845, when he was admitted as a member of the firm. Several years afterwards L. Johnson & Co. issued a very large and ornamental specimen-book, which Mr. MacKellar prepared, and in 1855 they began the publication of the Typographic Advertiser, which is still issued. It was edited for many years by Thomas MacKellar, but this labor is now performed by his son, William B. MacKellar. In 1860 Mr. Johnson died, and new responsibilities came upon the survivors. The firm-name was altered to MacKellar, Smiths & Jordan. Their business has steadily increased, and the foundry is now the largest in the United States. Mr. MacKellar cultivated the muses early in life, and in 1873 published a volume entitled Rhymes Atween Times. A second edition was published in 1890. He has also published a volume of religious poems. His verse is tender and melodious. His first book was the American Printer, issued in 1866, an excellent manual for the workman. He has been an active man in religious and benevolent work, and was for a considerable time president of the American Type-Founders' Association and of the Philadelphia Book Trade Association.

THOMAS MACKELLAR.

Mackie, Alexander, the inventor of a composing-machine, is a native of Dundee, Scotland, born in 1825. He is the proprietor of the Warrington Guardian, in England, and of a number of other newspapers. He is a lecturer and the author of a book entitled the Proverbs of Jesus. His machine was completed in 1869. It is in two parts. One is a perforating-machine, which punches holes in a narrow strip of paper corresponding to the letters which it is desired to set. This is a small machine, and is operated by girls. The perforations being completed, the strips are taken to the main machine, into which they are fed. The paper is drawn along at the rate of a tenth of an inch at every movement. On its top are little levers seeking to pass through, but unable, except in places where the perforations match them. When this happens a movement of the machinery behind it extracts a type from one of the pockets, drops it upon a traveling belt and delivers it at the end of a line, ready to be justified by hand. It does not appear that there is any distributing apparatus, so that this must be done personally, and the type set up in long lines by children, as they are in a type-foundry. Mr. Mackie has also invented an ingenious contrivance for setting up type in duplicate. He had a number of newspapers, each having many paragraphs in common. To set at once enough for all he put a perpendicular line of the same letter upon the galley. Say the word was Mackie, and that he needed thirty-four copies. He took from the line of M's thirty-four letters, or the length of a rule of this size, and emptied them at the lower edge of the galley. Then he set as many a's and emptied them, and so continued until all was done. They would then look thus:

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Distribution was effected by slicing off a line of M's and then one of the other letters. It is possible that a little saving might be effected in some tabular work by this method of composition, where certain figures were repeated many times, but for ordinary newspaper work it was not advantageous, as stereotypes could be more easily made.

Mackle.—A mackle is where a part of the impression appears double from a shifting of the paper while the movement is going on.

McMillan Typesetting-Machine.—This was invented in 1883 by John Loudon McMillan, at that time a resident of Troy, N. Y. It is in three parts. First is the typesetting-machine proper; second, a contrivance by which the type can be justified by hand, and third, a distributing-machine. The first is very small and compact. It consists of about ninety upright channels filled with type, like a line on its side. These channels are so placed that when a type is detached from one of them it falls into a groove which will also carry other letters of the same thickness or nearly so, these grooves converging at the bottom. By having the type fall into receptacles of this size they are unable to turn around, and the motion thus imparted is continued to the end. When a type is desired a key is struck below, and an ejecting finger thrusts out the required letter. The key-board is exactly the same as that of the Remington typewriter, and any accurate typewriter can set type easily, so far as the letters are concerned. When a letter has reached the common bottom of the grooves it is pushed forward by a little vibrating arm, and becomes a part of the line of composition. These lines are very long, being set lengthwise on a full-sized galley, and each galley contains a number of them separated from each other by brass leads running the whole length. When setting is going on a signal shows when each line is full, the galley drops down one line, and a new line is begun. The galley is taken to another place, where the type is pushed off into what may be called a stationary stick, and is there justified. It is placed in such a position that the workman is in an easy attitude and can do his best.

The distributing-machine is a round disk, upon which are a multitude of slots, each large enough to hold a long line, converging towards the centre and being separated at some distance at the edges. Into each of these slots lines of type are placed, and at the back of each, or nearer to the centre, is a gentle spring which has a tendency to force the line towards the outer edge. Were there no rim to this disk all of the type would be pushed out on the floor; but each letter has certain marks upon its front causing it to differ from other letters. They are nicks or hollows. The type can only pass out where these letters meet no obstruction, and the disk when revolving must pass completely around after depositing z or q before it will be able to deposit another z or q. The principle upon which the passage is forbidden is exactly that of a key in a lock. If the projections and hollows in the key do not meet corresponding hollows and projections in the wards the key will not work. Neither can a letter be pushed out at any place except where it is intended to be ejected. When the distributing-slots are filled with type, which is done with an ordinary composing-rule, clasped against the line, the springs being pushed back, the machine is set in motion, this movement being very slow. In fact, it is so slow that lines are changed without difficulty while the disk is revolving. Opposite to the rim containing the projections which fit against a certain letter are placed receiving-channels which are used, when full, in the composing-machine. The letters are nicked at the front, and there are no nicks on the back, thus enabling the type to be used in any ordinary case. The disk revolves slowly, and the type are pushed out at these orifices, each into its appropriate channel. In each revolution many letters are deposited, some of the letters, as a, e and t, having duplicate or triplicate gates, and every letter having one gate. The speed attained on this machine is about ten thousand ems an hour, but it can be made to do twelve or fifteen thousand, its limit being the speed of the workman who inserts lines for distribution. This machine, unlike the other two, occupies considerable space. Each of the operations thus described, composition, justification and distribution, is on a different apparatus, thus diminishing the loss if accident happens or one of a team of operators fails to appear. One man can set type the whole morning, justify through the afternoon, and distribute enough to last him for another half day of composition in two hours. The speed of composition is from four to five thousand ems an hour, and of justification the same. A test in a large printing-office in New York has proved satisfactory. Mr. McMillan is now at work upon an automatic justifying-machine, and believes that he has attained success.

McNally, Andrew, a printer of Chicago, was born near Belfast, Ireland, in 1836. He served a seven-years apprenticeship under John Watters, at Armagh, and soon after his time was finished came to the United States. He landed here in 1858, and worked in Trow's and some other offices in New York. He then went to Chicago, where he began the Evening Star, a penny daily. This, together with its job office, was sold out so that he could take charge of the Tribune job office, then the largest in that city. In 1864 he and W. H. Rand bought this job office and formed a copartnership as Rand, McNally & Co., at 51 Clark street. Their business rapidly increased, stationery and publishing being added, until they were overtaken by the disastrous fire of October 9, 1871, which destroyed their office as well as most others in the city. What was realized from insurance was very little, as most of the companies in which they had policies were overwhelmed. Mr. McNally did not lose his judgment. While the flames were raging he bought the only com-

ANDREW MCNALLY.

plete printing-office remaining in the city, rented a commodious brick building at 108 West Randolph street, and sent an assistant to New York and Philadelphia to buy type and presses. There were five presses in the office he had bought, and the next day he purchased five more which were in a warehouse on the West Side. Within a few days he had a force of several hundred hands employed, all taxed to their utmost. In 1873 he moved back to the South Side, and organized a stock company with a capital of $200,000. In 1881 this company put up a large building at 148 Monroe street, and in 1887 the capital stock was increased to a million. In 1869 the firm began publishing its Railway Guide, which has been a success. A very large number of maps have been issued by it, both in sheets and in atlas form, and this forms a very large portion of the company's business, which, however, extends into every line. Railroad printing is perhaps the largest specialty, next to maps. Many works of fiction and many guide-books have been published by it. When the question of forming a printers' society in Chicago came up in 1887 Mr. McNally took an active part in the movement, and later when a struggle against nine hours was necessary he threw himself into the breach and fought the demand until it was given up. He took a prominent part in the entertainment of the printers who went to his city that year and formed the United Typothetæ, and was elected a vice-president at that meeting. The succeeding year at New York he was elected president, and discharged the duties of the office with zeal and discretion. In everything relating to the Typothetæ, whether local or national, he takes a warm interest. He is now largely occupied with the World's Fair, in the direction of which he has an important position. In the winter he resides upon his farm near Los Angeles, Cal. Rand, McNally & Co. three years ago removed into a very large and commodious building especially erected for them. It is ten stories and a basement in height, with a frontage of 150 feet on Adams street and extending back 165 feet to Quincy street. In the centre is a court 60 by 66 feet. The framework is entirely of steel. In this building they find ample accommodation for their pressrooms, containing over fifty cylinders, their publishing-office, their composing-rooms, their bookbindery and their warehouses.

Macularse (Sp.).—To offset.

Maculaturas (Sp.).—Waste sheets, used in getting up color, &c., on press; thick wrapping-paper which comes around the bundles of printing-paper.

Maculature (Fr.).—Waste paper; spotted paper.

Madden, John P. A., a writer upon printing who united great learning with great accuracy, died at Versailles, France, on June 2, 1889, in his eighty-second year. He was a member of the Society of Natural Sciences of Seine-et-Oise, and had written two series of papers in the Typologie-Tucker entitled Études sur l'Imprimerie and Lettres d'un Bibliographe, which threw great light upon questions of early typography.

Made Up.—When type is put into pages it is said to be made up.

Magazine.—A periodical collection of news or miscellany in pamphlet form, usually appearing at intervals from two weeks to two months. The rules of bookwork are observed in periodicals of this class, so that they may be bound as books every six months or year. Great numbers of magazines are now published in the principal cities of the world, most of them being devoted to some single idea or group of ideas. Many of those intended for popular reading are now illustrated, it having been found that so many more copies can be disposed of that the extra cost is more than covered. The Gentleman's Magazine in London was carried on for a century and a half, and other magazines are still in existence which have been issued much over a half century. Dennie's Portfolio was the first American magazine which lasted a considerable time, and its editor, Joseph Dennie, is said to have been the first American who supported himself by the pen. In the second third of the present century the Knickerbocker Magazine was the chief monthly, but the publication of Harper's Magazine in 1851 began a new era. It gave an abundance of reading matter and many illustrations, and it paid its contributors. Other magazines since then have accomplished excellent work, among which may be named the Century, Scribner's, the Atlantic and Lippincott's. On most of the magazines it is designed to have not less than ten articles, of which three shall be illustrated. These are on the first sheets, as they take longer time to print, and nearly all now use surfaced paper for these illustrated articles.

The work on magazines begins months before the periodical is on sale. The drawings for an article on sleigh-riding must be made in winter when the snow is on the ground. Then the cuts must be engraved and the text written. After this comes the composition of type, the making of the plates and the printing. The author may reside in Russia, and it may be desirable to send proofs to that country. Besides the preliminary work there are three magazines always in progress. Copy for an illustrated article is given out early in July. The plates are made and the first form of the magazine dated October goes to press. One machine takes it and does not conclude until August, over a month being occupied. Towards the end of July the second form is put on another press, and about August 10 the third form on still another. Three or four more presses begin work later in the month, and in September ten or a dozen are all occupied upon the later pages, some forms being duplicated or triplicated. In August the first part of the November number has been begun, and in September the first form of the December number is laid on. Our larger magazines would take an ordinary press fifteen months to get off a single issue. In consequence a new press has been devised for the plain forms and another for the illustrated forms, the latter producing forty thousand sheets a day. The former are printed from a roll and the latter by a machine requiring four feeders.

The fine printing of these magazines has undoubtedly raised the standard of printing everywhere in the United States. Such work at such speed could not have been equaled anywhere twenty years ago. New machinery has been devised, inks have been improved, and paper has been given a much finer surface. In these periodicals the pages with engravings are printed upon surfaced paper, while the other pages are printed upon paper of equal quality, not surfaced. This necessitates having the illustrations placed sometimes a little before or after the place in the text which refers to them, so that they may go in the proper form. Above all, greater skill and ability have been acquired by the workmen in the art of overlaying. Each illustrated form requires from three to four days to make ready. From the ability of the printer to represent the thought of the artist fairly it has resulted that much finer and better engraving is employed than was possible years ago on anything except with the very finest and costliest books, and as a consequence a much greater variety of original work in the way of drawings and sketches is prepared for the magazine. There are now twenty persons who can draw well for the press compared with one a score of years since. Process engraving is much employed. Articles used are all paid for, and at a rate far higher than that of the average of the American press.

Magazzino (Ital.).—A store, warehouse, office or shop. Magazzino della carta, paper warehouse; magazzino del lavorerio, place where tools and iron-work are kept; magazzino dei libri, where the books and printed sheets are kept; magazzino di tipografia, composing-room.

Main (Fr.).—A quire (literally, a hand, and therefore a handful).

Main's Machine.—A cylinder machine invented in England by T. Main, sometimes called a tumbler, on account of its peculiar motion.

Maine.—This State was settled in some places very early, but from the fact that it was legally a part of Massachusetts it depended for its newspapers and other printing upon that colony, to which it had easy access by sea. S. N. D. North says that printing was introduced in 1780, but does not say where. Thomas B. Wait, who had previously been concerned in the production of the Boston Chronicle, went to Falmouth, now Portland, Me., in 1784 and opened a stationer's shop. Finding Benjamin Titcomb, a printer, already established there, he formed a partnership with him and published the Falmouth Gazette. It has continued ever since under different names, and is now the Portland Advertiser. D. J. Waters published the Journal and Advertiser at Castine in 1799, H. S. Robinson the Eastern Star at Hallowell in 1794, and Russell & Hoskins the Telegraph at Wiscasset in 1796. Other towns in which printing was practiced at an early date were Fryeburg and Bucksport. The number of newspapers published in 1810 was 8; in 1840, 36; 1850, 49; 1860, 70; 1870, 65; 1880, 123. At that time there were 12 dailies and 112 other periodicals. Newspapers were published in fifty-four towns. In 1890 there were 17 dailies and 139 other periodicals. More printing and publishing is done in Portland than anywhere else; Augusta comes next, and then follow Bangor and Lewiston. The quantity of work executed in Augusta is very large. It exceeds any other town of its size in the Union, and surpasses many of five times its size. There are several publishing-houses there in a peculiar line who do a large business.

Maioli, Tommaso, a friend and patron of fine books and elegant bookbindings, who lived in Italy at the beginning of the sixteenth century. His bindings are described as the perfection of art. Nothing is positively known concerning him. He adopted the liberal inscription, "Tho. Maioli et Amicorum," which was afterwards imitated by Grolier.

Majuscole (Ital.).—Capitals.

Majuscoletto (Ital.).—Small capitals.

Majusculæ.—Manuscripts written entirely in capital letters. This was the earlier form of writing, and is that found in ancient Latin manuscripts and in those exhumed at Pompeii. After a time scribes found an easier method of making letters, and capitals were used only for emphasis or ornament. This change began to appear about the sixth century. Majusculæ are also styled capitales literales.

Make.—In casting off matter it is said that it makes so much—a galley, a stickful, &c. That is, it occupies so much space.

Make Even.—In copy with long paragraphs, or in newspaper work, compositors have sometimes to finish their portions at the end of a line, whether it ends a paragraph or not, in order to expedite the closing up of takes. They are then said to make even.

Make-Ready.—Used as a noun to refer to the tympan sheet of a particular form and its overlays, made ready for use.

Make-Up or **Maker-Up.**—The man who takes the type as it comes from the compositor and prepares it in regular order for printing.

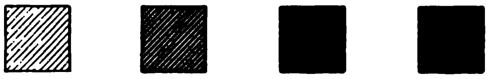
Making Ready.—Under this head are comprised all of the procedures necessary after the form is placed upon the press until a perfectly satisfactory impression is produced upon the sheet. Owing to the imperfections of type, machinery and ink it is impossible to get at once a satisfactory result from the form, and a series of experiments, more or less prolonged, are necessary so that each letter shall be clearly and distinctly printed, having no more and no less color than any other part, and that the whole appearance shall be as good as can be desired. When wood-cuts, brass rule or mixed old and new type are in the form the difficulties of the printer are much increased.

After the form has been securely fastened in its appropriate place and the packing, described elsewhere, has been made ready, it is still further made ready in one of three ways. The bearers can be lowered and more impression can be put on. This is a very poor method, for it wears down new type in order to show the face of the old, and invariably produces thick and coarse presswork. A second method is to raise the low type to its proper height by placing one or more thicknesses of paper under them, which is called underlaying. A third method is to give additional thickness to the tympan or cylinder against those parts which show a weak impression. This is called overlaying, and is more complicated and difficult than the other methods, but is indispensable in fine work. In this it is united more or less with underlaying, each process having its value.

The chief difficulty is that arising from unevenness of impression, which will be taken up first. While a whole form should be perfectly even upon its surface, the cylinder meeting it exactly, it is rare that this is the case, except in a new press with new type. Very trifling wear here or there will much lessen the color received in that place, and have a tendency to increase it in another. With stereotype or electrotype plates a new difficulty is added, owing to the expansion or contraction of the wooden bases, or to the unequal height of the plates and metal blocks. Type is rarely too high, but brass rule and blocks may be. If the wooden blocks are perceptibly so they should be sent back to the stereotyper to be shaved off; if plates adhering to patent blocks the same process should be resorted to. The blocks themselves can easily be tested. Lay half a dozen, including the supposed high ones, on a level, and then lay another half dozen alongside of them. Upon both piles place a spirit level, resting partly upon one and partly upon the other. If some are found to be too high they must be reduced. High brass rule must be treated by cutting down a part of the overlay, and will be spoken of further on.

If a form has no high pages it may have low pages, and very frequently has low places. The centre of the bed of a press is often low, from having every form laid there, and of course having more wear in that location than anywhere else. This is also the case in the centre of the cylinder or platen. To obviate this difficulty the stereotype pages which are low are raised by pasting or laying one or more thicknesses of paper against their bottom until they are raised to the right height. A letter-press form may have a round spot in the centre where it is low, and in this case, if not too large, a circular piece of paper is pasted upon the under side. This process should be resorted to everywhere there is a low spot, unless more than a fourth of the area requires to be covered. It is not expedient to have a greater part of the whole underlaid than this, as the form is then uncertain and dances. The spaces work up, and the whole of some portions rise. If a larger part is low the excess should be treated by overlays as well as possible. The object of underlaying is to have an even surface. The rollers do not impart the ink well if the type is low, and the impression surface does not cause the paper to take it off properly. The result then is that the impression of the type is comparatively faint, but muddy.

Evening the surface of the form is the work accomplished by underlaying; but while this is indispensably necessary, the finer work is accomplished by overlaying. No art of man has been able to get a perfectly smooth, equal color from all parts of a form without experiment after the first impression. Some parts will be lighter than others, and some darker. If the ink is properly distributed and the underlaying is correctly done it is probable that there will not be many dark spots, but there may be many light spots. When this happens an overlay must be put on. This is a piece of paper very nearly the size of the light spot and following its shape. It may be of the thinnest India paper, or it may be card-board or several thicknesses of good, firm paper. Whichever it is it presses the paper down firmly upon the type and gives the requisite impression. The letters now show with much more clearness. The theory of this may be illustrated by the following diagram :



The principle upon which an overlay acts is that of increasing the pressure. If the four squares shown above are inked and an impression is taken sufficient for the whole the impression would be so great that the fine lines of the first would nearly pass through the paper, while in an hour they would be completely crushed. There might be a little too much on the second, but on the third hardly enough ; while the last, designed to be completely black, would be gray and uneven. Each of these four squares requires a different pressure in order to take off the ink which is deposited upon it and to invite the roller to leave an equal quantity the next time. This can be secured by making the cylinder or platen thicker in each place where more color is required. Thus, if one thickness of paper will give the necessary distinctness to the first square, two will probably give enough for the second, three for the third and four for the fourth. Such a pressure on the last would take off nearly all the ink upon the diagram and allow more to be taken from the two, four or six rollers which touch it on the entering and return trip of the bed each time. Thus every part of a cut is very effectually covered with ink, no part having too much. The pressure is immensely augmented by these thin pieces of paper. It would be possible on most forms, by having seven or eight thicknesses, so to increase the pressure in the particular place where they are applied that the part beneath would be crushed or something would give way in the machine, although the seven or eight thicknesses would not measure more than the seventieth of an inch in thickness. In a large form of letter-press the overlays are small, although they may be numerous ; but in a cut form the overlays cover a great portion of the surface. They must be so put on that a full, lustrous black is shown by the engravings where it is necessary, and from this the color tapers off to the lightest and most open parts. When cuts are worked in the same forms as letter-press the overlay, when applied to the engraving, will lessen the pressure of the cylinder upon the surrounding parts, and consequently they, too, must have overlays. Supposing that a cut has its greatest shade at the edge nearest the letter-press, it will probably require several thicknesses of overlay to bring out the impression properly. Before these are put on the type looks distinct, but after they are adjusted the edge against the cut will hardly show. One or two thicknesses must be put here. Thus the whole surface of the tympan must be patched over.

It will often happen that a small portion of a cut or a page is too high. The part may not be large, and the method of lowering adopted for cuts or blocks which are too high all over their whole surface cannot be adopted. In this case the sheets upon the cylinder or tympan must be cut or scraped down. Scraping is sufficient in many cases, an ordinary penknife or eraser being used ; but sometimes a part must be cut away. This, for instance, is required where a brass rule projects. A piece of paper is cut out the length of that part of the rule which projects and only a little wider than the face. Every form well made ready has some places where paper is required to be added to the impression, and others where some part has been cut or rubbed away. The difference in thickness which is required to make a difference in impression is very slight. A single piece of ordinary paper is often entirely too much. Perhaps three hundred sheets of ordinary paper will make an inch. A quarter of one of these sheets in thickness will often prove sufficient, and a thin tissue paper of an eighth of the thickness of one of the others will cause a change in the appearance of the matter immediately under it. By minute alterations of this kind a great difference is effected in the appearance of a cut. In New York most men employed in making ready have four different thicknesses of paper, used separately or conjointly, as overlays. The paper is usually soft, but of good material.

This method of overlaying is adopted on reasonably good type and engravings ; but much of the work of a printing-office is upon old type and inferior engravings. The customer will not pay for good work, and wishes the forms printed as rapidly as possible. Mixed forms of old and new type, with or without brass rules, can be made ready with hard packing only at a great waste of time. In many good offices therefore, and formerly in all offices, these were printed against a soft blanket or against india-rubber. Both had and have advantages. In the latter the qualities of the rubber enable it to give a pressure to the lower portions, while yielding sufficiently to the higher parts. When the use of this kind of blanket was first discovered all work except the finest was done with it. To-day it is in undeserved neglect. The other blankets were of Welsh flannel, broadcloth or billiard-cloth, each of the best. They were drawn tightly around the cylinder, and upon them or the india-rubber blanket were strained sheets of paper, upon which, as usual, overlays could be pasted.

The making ready of a form is a very intricate process, and requires much judgment and care upon the part of the workman. Additional details are given under Overlay, Packing, Presswork and Underlay, the four subjects overlapping.

Making Up.—The art of determining the proportions of a book, job or newspaper, putting the proper heads and foot-lines to it, adjusting the interior spacing, laying it on the stone, placing the chase and furniture around it and locking it up. The parts which relate to these processes are discussed under Imposition and Locking Up, and in this article the manipulation of the type in the hands of a skillful workman, as he labors to present a finished production, will alone be described. The easiest matter to make up is a single page, which is the form of many jobs. This is set according to the views of the customer, who desires a note-circular, a letter-circular, a card or an auction-bill, &c. Matter imposed in a single page rests against the left side of the chase, the head being towards the make-up. Usually speaking, it is made of the proper length on the galley by leads, lines of quadrats and slugs, and it is generally about as long as is consistent with good margin. If the type matter is too short the inquiry will immediately come up why it was printed on so large a sheet of paper. Wide measures can be spaced out a little more between the lines than narrow ones. Thus, double-leaded long primer is as open as a measure of twenty ems pica ought to stand, while triple leading can be used on matter forty ems wide. The job compositor usually sets up his matter and heads solid, or with a lead between his lines, and then puts in the extra spacing after the matter is all set. It is the custom to use a line of quadrats below headings and above dashes, increased a couple of leads below dashes and above heads. He determines his spacing, completes his page, ties a string around it and deposits it upon the stone, his superfluous leads and other material being at the same time cleared away. If the chase is much larger than the page to go into it a piece of furniture, preferably of metal, is placed at the left-hand side and the matter is pushed up against it. The other furniture is then looked after and the sidestick and footstick are put into their appropriate places. The cord is taken off, the furniture being closed against the matter as soon as possible ; the quoins are inserted, and the chase is locked up. The matter may have been proved on the galley, or it may then be proved.

When two, three or four pages are imposed the first of these is generally sunk somewhat, and the last may be left short. Each of the other pages must, however, be of the same length. When larger than this the making up is that of a book form. When the first form of a book goes to a stone-hand to make up he is given a gauge for the length of each page, or is told to make it of the size of another book, sometimes a line longer or shorter. He proceeds to cut the gauge, if he has none, from a piece of reglet, making a notch where the end of the page should come. Every page in metal must be of this length, whether it shows in printing or not. He takes the first page, puts in a line of quotations or more, according to whether the book is to be very open or not, sets up a half-title, puts the requisite space below the head, either with or without a dash, and adds enough of the text to complete the page, at the foot of which is a line of quadrats, having in it the signature mark of B or 2, if there is finally to be a preceding form. If there is to be no allowance for one no signature mark is placed, for signature A or 1 is the title-page, not being printed, but understood. The page he is making up then becomes page 3. The next page has a running folio, which this has not, the rule being in books generally that folios are omitted on sunken pages. This page, if entirely text, is used to correct the gauge by. Some compositors, indeed, do not make their gauges until the first page of text type is made up. The page must be so many lines of long primer or so many lines of another type in length, and if it is to be a leaded book each line must be accompanied by its lead. If the book is long primer the old rule was for the heading to be in small capitals of that size or small pica, occasionally, but rarely, being in pica. This rule is now little followed. Capitals are used of one or two sizes smaller than the text; but Italic, in upper and lower case, is now much in vogue. It may be of the size of the text or the next larger, but in some elegantly printed books two, three and even four sizes larger are employed. Of course, the words must be short where there is so great a difference. Below the small-capital folio it was the rule to put a line of the quadrats of the same size of type and to follow it with a lead if the matter was leaded, but many books are now printed in which this proportion is much diminished. The foot-line at the bottom is a line of quadrats of the same size as the body of the text, and with a lead if that is leaded. One object of this is to provide for a long page where an extra line must be crowded in. By having every page of the same length, whether long or short, there need be no difference in the furniture, and the pressman will always know that his form is right; but in these days few pages of book-work are made up long. It is easy in leaded pages with many heads to drop in one or two more leads in each place and drive out some matter. In some it is easy to take in. Where neither of these plans can be adopted, the author can be asked to make a new paragraph in his matter or to run in one. Occasionally he is asked to supply some words or to strike out some. If a page is made long the page facing it should also be long, and not that at its back. The former is very easily perceptible, while the latter is not.

The gauge having been verified and the first text page made up, progress can be made very quickly. It is necessary, however, to add a little to the subject of page headings. Where the page is large the head may be in capitals, sometimes of a size or two larger than that used in the text of the book. Public opinion permits these folios to be of old style or French old style, while the body is in regular modern Roman, but it does not allow any other kind of face, excepting those which are generally called Old English, or which bear a close resemblance to it. Neither Gothic, Clarendon, full-face, Ionic, Celtic or any other plain face, nor any ornamented type can be used here. Nor is it permissible to use them anywhere in the book if it is a book of literature, as for instance, Hawthorne's Scarlet Letter, Bancroft's History, Tennyson's Poems, Luther's Table Talk or Boswell's Johnson. Scientific books and dictionaries are compelled to vary from this rule, and the innumerable books issued each year, chiefly for the benefit of some person or locality, pay no attention to such a rule, but riot in all of the resources of the type-founder.

When a page is completed it is tied up and set in some convenient place on or near the stone, or under the make-up's frame. In most places there is a board across the lower edge of his stand upon which type can be put. When the second page is done fold a piece of paper so as to make six or eight thicknesses of a size a little larger than the page, lay it upon the first page and put the second page upon it. Continue this until there are enough for a form; then begin a new pile with page 13 or page 17, and continue this until the make-up is stopped. With most books, however, the first form is looked for very anxiously by both the author and publisher, and eight or twelve pages are made ready in chase at once. A careful proof is taken on the press, and work is then often stopped both in composition and making up, but more frequently the work proceeds. Often the one who imposes also acts as the deputy foreman on the book. He gives out the copy, looks after letter and attends to all details. In each book there is a multiplicity of little things to be considered. The first in a book of the kind mentioned is the treatment of extracts. It is better for the appearance of the book to have the author so treat them that they appear as a part of the text, but two considerations prevent. One is that the author does not desire to have them appear as his own writing, and is unwilling that any one shall so mistake them; the other is that the extracts take much room, and if in a smaller type would save much space, and consequently presswork and paper. When the author or publisher desires them in smaller type the right proportion is for pica long primer or small pica; small pica, bourgeois or brevier; long primer, brevier; bourgeois, brevier or minion; brevier, minion or nonpareil; minion, nonpareil; nonpareil, agate; and for agate, pearl. If the former are leaded the latter should be, and if they are double leaded the latter should follow the same rule. Notes will be for pica or small pica in brevier; for long primer down to minion, in nonpareil; and for nonpareil or smaller magnitudes one size smaller than the text. Extracts should be separated more than a lead from the other matter in leaded work; in solid work this is determined by the amount of compression necessary. In some cases a line of quadrats is used. Notes in full-sized octavos and duodecimos are now very often set in scant half measure, a line of quadrats being between. The effect is very good.

One of the first things to determine in a make-up is as to ornamental initials, and the use of head-pieces and tail-pieces. If the book is to be large in proportion to the matter contained in it, it is advisable to use all three. Each chapter heading in some books and each heading of a book (or large subdivision) in others takes a head-piece. This ought to extend completely across the top of the page, and be no narrower and no wider. Its depth may be from a line of long primer (seen in some old books) to three-quarters of an inch or an inch. It ought not, however, to be more than the eighth of a page in depth. Below it will be some blank space, followed by the half-title, chapter heading, &c. These pages are not numbered, but skipped, and the next page jumps two forward. Sometimes, however, there are very small figures at the bottom of the page so that there can be no doubt. The initial letter is justified in. If long, light tendrils project from it at the front it is now considered in good taste to let them fall over into the margin, and the furniture is so adapted around it that this can be done. No lead should ever be added between lines in the text to accommodate that to the initial, nor should any be taken

If there is a blank anywhere let it be with the in-
tself. This rule is also applied to all run-in cuts.
ieces are omitted when the matter at the end of a
er comes too close to the bottom of the page, al-
h by squeezing it might be possible to insert one.
should be a little space between the tail-piece and
nd of the text and some below it. The tail-piece
d not be more than half of the width of the page.
important question which comes up early in mak-
p double-columned octavos and quartos is in regard
centre. It was formerly the custom always to have
there; but of late a reglet is used. This has no sharp
as a rule has, to cut the blanket, the sheet and the
s; it does not ride up and work unduly black, and
ts less. The same considerations have prevailed
st rules at the head of pages. The objection to reg-
these places is that a black line, with two white
alongside of it, is more apparent than one white

The centre reglet requires greater width to render
ctive. A nonpareil column rule divides one side of
e more effectually from the other than a long primer
When the latter is used on a book of any extent it
be of metal and should project a little beyond the
enough to hold the two slugs at the bottom or the
nes of quadrats. If a column rule is used the part
rule which should appear terminates even with the
n of the short letters, such as a, n, m, r and s, and
the bottom of the descending letters, as p, g and q.
ottom of the rule should pass beyond the face. If
s rule is used just before the type, below the head-
he column rule should counter on it.

s make much trouble to the weekly man. Before
ing is done with them they should be trued up. The
ould be parallel with the bottom, and each should
a right angle with the sides. The distance which
should be from the text varies much according to
igencies of printing and the nature of the book.
as small as is ever seen at the side is a third of a
m, but sometimes this exceeds a pica. In small
, however, where there is not space to throw away,
pareil or thereabouts is the proper size. It should
asonably uniform throughout the same volume.
and below also vary somewhat. A lead or two
en the cut and the caption, and from a brevier to a
rimer between the caption and the next part of the
hich runs completely across the page, is a good pro-
n; above the cut a nonpareil. The exigencies of
ake-up, however, occasionally demand that he shall
more space, and then it is often given at the top.
re frequently sent in of very peculiar shape. The
therefore, at the side must be accommodated to

One form is called by compositors a staircase.
ne below the top is one, two or any number of ems
wider than its predecessor, or it may be narrower.
nes below continue the further indentation. Look-
the succession, therefore, they resemble a staircase.
ter-press matter this would be extremely trouble-
as the wood below the face cannot be sawed so
ely and truly, line by line, as to give effective sup-
o metal lines which press against it. In electro-
the width of the cut can be measured against where
ine will come. The type is set in the stick, quad-
presenting the cut. When the page is cast the cut
soldered in at the place left vacant. Lines about
requently divide badly and space badly. In the
r case two letters on either side may make a divi-
In the latter it must be allowed to go. It looks
than spaces between letters, which, however, must
imes be resorted to. The caption beneath illustra-
hould be in as small type as is consistent with legi-
and the size of the page. Small capitals are very
used for this purpose.

en the copy is intricate and its reproduction in type
nded with many difficulties it is best to have the
roof, revise and author's proof read and corrected
it is advisable to begin the make-up. It is much more difficult to correct in made-up pages, and there may be alterations which will render necessary the running over of many pages. Notes give a great deal of trouble, as they must begin on the page to which they have reference. Occasionally, however, a second or third reference mark is so low down in the page that it is impossible to put it below the note already there. In this case the author must be called in. He can sometimes run some of the matter into his text, or he can increase or diminish either the text or the notes. Illustrations as a rule should be near the matter which refers to them, and preferably higher up in the page than its middle. If the cuts are small, but numerous, it should be the object of the make-up to have those which are on the same page separated considerably. If one is high up, the other should be low down on the other side of the page. Where two like cuts are used on facing pages, they should be at the same distance from the top, one on the right and the other at the left. If this cannot be done, they should not be nearly at the same distance from the top, but one should be considerably lower than the other. Often they must be at a considerable distance from the text which relates to them, and it is better to do this than to have them come in awkward positions, or to be too crowded. Full-page cuts which are longer than high must be imposed on the right-hand page, if possible, with the caption at the outer margin. It is not necessary in such places to insert the folios. They can be omitted, the next page giving the even folio. Tables must sometimes be divided in bookwork. In this case the heading is repeated for each page, with the word continued. If dollar marks or pound marks head the columns, they must be repeated in the second half. Headings to tabular matter always read upwards, thus allowing the last line of the heading of the first column to precede the first line of the heading of the second column. If a table comes in such a place that the beginning, the headings and a few lines of the body of a following table cannot be inserted, the bottom of the page should be left blank. Signatures to letters in books are generally set in capitals, a blank line separating them from the body of the letter. Of course another blank line or more must be below. To denote a division of subject more than is afforded by a paragraph some writers ask for two or three lines of space, and some even require more. The usage is good. When a chapter ends at the top of a page, only three or four lines running over, matter must be borrowed from preceding pages. Those immediately before should be leaded between headings and other places which will admit of it, new paragraphs made if sanctioned by the author, and paragraphs lengthened a little so as to drive out a couple of words in the break-lines. Many of them end within three or four ems of the end of the line. By going back ten or twelve lines the matter can be pushed forward so that it will not appear to be widely spaced and yet answer the purpose. Many printers shorten the preceding pages one line each until they gain enough. At present this is not regarded as good practice, although it was approved fifty years ago. The make-up ought always to measure off for several pages ahead, so that he can foresee this difficulty. Lengthening pages was once much resorted to so that lines could be taken in, but it is now looked upon with less favor even than shortening. Leads may be taken out and break-lines run in to avoid a bad ending. The two columns of a page should descend to an equal distance. Less than a quarter of a page for a run-over is regarded as bad; but from one-half to two-thirds is regarded as preferable.

Much of the work of the make-up is governed by the author. Special headings are submitted to him, as well as to the master printer. He can frequently indicate ways of getting out of difficulties. Adding to matter, subtracting from it, and the breaking up of one paragraph into two are methods in which he can favor the workmen. An awkward table can, by his desire, be changed from nonpareil to brevier, so as to cover two pages where it was formerly one and a quarter, or it can be condensed by the use of agate upon one page. An illustration can be discarded or put into another part of the book, or a new illustration can be made to fill some vacant space. A handsome book is not to be improvised, and much labor is frequently required both from printer and author to make it perfect in all its details. The folios over the top of the pages should change with the subjects; they are there for the instruction and guidance of the reader, and if unchanged do not answer this purpose. Take for instance a history of England. To put History of England over every page is idiotic. After the reader has picked up the book and looked at it once he knows that it is a history of England, and he does not care to have it repeated several hundred times. Over each part should be put a distinctive wording, as for instance "The Rule of Cromwell," "Accession of William and Mary," or "Literature Under Queen Anne." For one issue of his novels Dickens wrote a separate running folio for each page. All blanks in letter-press work should be of metal so far as possible.

The make-up generally has a double frame upon which he can work. Cases are mounted upon this frame, and upon them his galleys are placed. One of these galleys is wide and almost entirely of brass, if not wholly so. Its width may vary from ten inches to double that size. On the other case is his savings-galley, or the headings which have been previously used and which are to be used again. If the folios change these have previously been set up and are then ready. He takes the first, places it on his galley, puts the line of quadrats beneath, and notices by his proof where the first following page was marked to begin. This has upon it in the margin something like the following: "Sig. G, p. 97." A stroke against this shows at what line the previous sheet ends. Or it may be that the previous signature is there with its proofs. It ought to be compared with the matter above and below, to make sure that the galley is the same as that which is called for. Having emptied the matter, instead of putting a foot-line to this page the workman inserts a signature mark. This is most usually in small capitals of the text type, but is frequently larger. If the page is large a capital would not be too much. Figures are much used in America for this purpose. After tying up the page and depositing it on the stone or under the case the next page is taken. If the form is to be locked up at once the workman, after laying his pages on the stone in their proper relation to each other, puts over them the chase. He has previously divided the pages into two or four parts, to allow the crossbars to touch and rest upon the stone. The pages are then separated more widely, to about the extent required for margin; the various pieces of furniture are inserted and applied around the edges, and the pages are ready to be untied. This is done first on one of the inner pages. As the cord comes off the other pages and the furniture are pushed up against the unprotected one, for if this were not done the whole would tumble down. It need not be remarked for the benefit of book compositors, but it may be for that of news compositors who have never been employed in a book office, that the type is dry. No water is applied by the sponge or in any other way during the whole of the make-up. When one page has its cord off the next interior one is divested of its string, and so on until all are done, taking pains to keep the furniture well against the matter. Before any page is untied, however, the imposition should be carefully examined to see if any page is out of place. A mistake can easily be rectified then, but it will take much time later on. The quoins are inserted and the locking up is completed. See IMPOSITION, LOCKING UP, MARGIN and TYING UP. A well made up form should have the pages parallel to each other at the same distance throughout, and all intervals alike, except in the rare case of a large page. It will sometimes happen that a table or a cut is too large to go in the space given to other pages. It cannot be cut down. The furniture margin, therefore, is cut away on each of the four sides, so that the apparent centre of the cut is where the centre of a type page would have been.

In newspapers the plans adopted are different. Whatever the size of the journal, each page is made up as a whole. Matter may run over from another page, but independent of this there is very little relation between one part and another. Many special newspapers, as for instance the religious and trade papers, have small pages containing three ordinary columns of type or two wide ones. From these they mount up to four columns on a page, the size of Harper's Weekly, or five columns, the former size of Bonner's Ledger; but whatever the newspaper may be the matter in one part bears no necessary relation to the matter in another part. A multitude of observers and chroniclers record what they have to say, and each makes his account complete. There may, indeed, be some reference to a previous day with the same newspaper or to another article in the same issue. Other than this there is no connection. The Columbus celebration for each day is complete; so is the report of crimes and accident, and so is the money market. Convenience dictates their present positions in newspapers, but the reader would learn as much if the crimes were on the last page, the money market on the first and the editorials after the crimes. On the largest American newspapers one hundred men are required to put the matter into type, these men setting in the neighborhood of one hundred galleys a day. The problem of the foreman is how he can keep back some kinds of matter until late in the evening, and still put the paper together without fail. Every appliance is used for this purpose. Quantities of type are bought; there are sorts in abundance: galleys are counted by hundreds, and there is every convenience for proving, correcting and storing. No proof is taken after the matter is emptied in, and an error not corrected in the galley passes through the paper.

The first part made up is the advertisements. As a rule these are placed on the inside pages, only those being on the fifth and eighth pages which bear an extra price. As the advertisements are given out by the copy-cutter they are roughly classified, and it becomes the business of the make-up to do this more thoroughly. A proof lies alongside of each galley which he is preparing, perhaps quoined in. He places the advertisements in alphabetical order, if that is the custom of the paper, and puts those of like kinds, whether on one galley or another, in their proper situation and under their own heading. He may perhaps have twenty galleys up at once. The matter is transposed from the one which furnished the proof to others, and as far as possible each column is made up on a galley, and is there justified. Of course, to remove the contents of this galley to the form is a matter of only five or six handfuls. All the other work is done. Those which are to take positions on the eighth page are placed in the form, and so are those on each of the other pages where an extra price is asked. The wants are classified as much as may be, and so are all the other small advertisements. By 9 o'clock on most newspapers, and by 8 o'clock on many, the advertisements are completed so far as they have come in. It is a rule in large newspapers to give the make-up of a particular class of matter to one or two men, who begin on it early and work until it is concluded, when they are transferred to other duty. Some miscellaneous matter, including book reviews, has been set in the afternoon, and perhaps an editorial or two. These are arranged as far as possible on galleys, although the literary and scientific matter may be emptied into their appropriate pages. The next matter to be set after advertisements is the financial, including the markets. This is plain sailing. As soon as they are complete they can be made up with the advertisements which fill out the pages. Thus little by little the indispensable subsidiary matter is in the forms, and the matter is locked up. Plates are not made, however, until a late hour, for interesting late news may necessitate a change. At 11 o'clock, or half-past 11, however, the night editor is generally able to tell what is to be in the paper. He selects from the mass of interesting matter that which appears to be most striking. One part of this begins the first column of the first page; another the third column; still another the fifth, and the last the seventh column. They are not, perhaps, the most important articles in the paper, but they are those concerning which people will have the most curiosity. Lesser articles fill the remainder of the page. If one subject requires much space it will generally begin on the last column and run over to the second page. If there are two such, a little note at the bottom of one of the columns says: "For continuation see page 5." This page is held back for some considerable time, for there may be important events which are not known until later than 1 or even 2 o'clock. The test of this is the degree of interest. Had Cassius M. Clay, a well known Kentucky politician, been assassinated during the War of the Rebellion, newspapers being then conducted as now, this would have secured a spread head on the first page; but had there been equally important matter on the remainder of the page, and Horace Greeley, a much more important man, been killed, Clay would have been thrown out, placed on an inside page, and Greeley would have taken his place. The taking-off of Lincoln would have given that the first column, and there would have been no other matter on the first page, with perhaps the exception of the attempted murder of Seward. Some unimportant matter cannot be curtailed, as for instance, court calendars; but when important news comes in late at night and requires much space most subordinate matter is cut down to make room for it. This is done chiefly in miscellaneous, local and ordinary telegraph news. Washington dispatches are rarely curtailed, nor are the articles of the dramatic and musical editors, but the latter are frequently laid over. The editorials are enumerated on a slip of paper for the benefit of the managing editor, with the length in tenths of a column. From this he decides what articles shall go in, and their order.

It will be seen that the task of the make-up or make-ups is difficult. The editor has an amount of copy which he can partly control, but not completely. Speaking algebraically, he has of known quantities a, or editorials; b, or financial; and c, market or court reports. These he cannot compress. He has m, or advertisements, which will probably be the same to-day as yesterday, but still may not be. He has then in addition local matter, represented by u; ordinary telegraphic reports, represented by v; foreign intelligence, shown by w; and miscellany, x. Allotting a certain number of columns to each, as he does early in the evening or afternoon, he finds that he must leave all of his plans unsettled for lack of knowledge of what will be reported between sunset and three in the morning. These may be called y, important matters, which must be given, and z, very important matters, which must be given with the greatest fullness possible. The question for him, therefore, each day is as to the probable magnitude of each of these factors. He has $a+b+c$ as constant quantities, varying little; m may vary considerably, but can be foretold pretty nearly. Add to these $u+v+w+x$, each varying largely, and all, except x, of much value to the paper, and the task is difficult. From the space which these occupy must always be subtracted that which will be necessary for y and z. All this is done late at night, under circumstances which admit of no delay, either by the editor or the printer.

Forms are now generally made up flat. Formerly, when the type itself went to press, the matter was put upon turtles, a curved bed, with column rules thick at the top and thin at the bottom. The dash and advertising rules were curved both at the bottom and the top. But since paper stereotyping has been introduced flat beds have been used for making up. The chase is of equal or nearly equal thickness all around, and the locking up is done by means of screws. The headings are of solid pieces of metal, the name of the newspaper on each page being electrotyped with solid backing. The heading of the paper is also solid. In making up the head of the page is towards the workman, and his left hand is at the first column of the page. He deposits at the head, against the rule, a nonpareil or pearl slug, and then empties in matter until the column is about full. The column rule is placed against it, another slug is put against the head of the page and the matter is deposited there. The third and other columns are treated in the same manner until the last, which is at the workman's right hand. At the bottom of each column is a slug. The sidestick and footstick are pressed up against the matter, the screws are turned and the form is planed down. Before this is done, however, it is seen that the matter is carefully justified. In pages where some of the matter can be put in, the remainder waiting, the column rules are first inserted, the slugs holding them up, and the type is then placed where it is needed. These chases and rules have also been so contrived that the latter are fixtures.

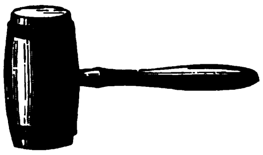
In small daily papers employing from six to twenty men the forms generally go to press on an ordinary cylinder machine. The most common method of making these up is to have advertisements begin the first page, followed by general reading matter. On the second page the editorial, a column or two in length, is found, followed by general news. The next page has the local matter and the new advertising, and the last page contains the telegraphic news and any very late local reports. Column rules on such journals never should be pieced, and the columns should be very carefully justified. A good plan to take them off and put them on the stone is by a pony derrick. Only metal should be used in the forms of a daily paper, except for quoins. The make-up on a weekly paper is very similar to that on a small daily, except perhaps as to the classification of matter. The common country weekly has a story on its first page; on its second the editorial. The third contains the local matter, and on the fourth is agricultural or religious miscellany. When there is little capital the first side, consisting of the first and fourth pages, is worked two or three days before the second side, so that the type can be distributed and the same chases and furniture used. See, for remarks upon some kinds of special composition used in books, under SUBSIDIARY MATTER.

Makulatur (Ger.).—Waste paper.

Makulaturbogen (Ger.).—Waste sheets.

Mal asiento (Sp.).—Out of level (said of the rollers or any portion of a press).

Mallet.—A wooden hammer, employed in planing down and locking up. In England the head is square, but in America it is round.



MALLET.

Maltese Cross.—A religious sign; thus: ✠.

Mame, Alfred, head of a large printing-office in Tours, France, founded by Amand Mame about the end of the last century. He took his nephew, Ernest Mame, into partnership, and in 1833 his eldest son, Alfred, who became in 1845 sole proprietor of one of the largest printing-offices in the world. Printing, binding and publishing are carried on. A score of years ago there were thirty steam-presses, capable of turning out twenty thousand volumes a day. Over a thousand hands are employed. The books produced are chiefly religious.

Manata (Ital.).—A handful.

Mancha (Sp.).—Mark made by a projecting space or quadrat in the form when printing.

Manchego (Sp.).—A jocular term for an out or a doublet.

Manchester.—Manchester in England does much printing. The first book known to have been issued there was a volume of mathematical lectures by John Jackson in 1719. It was printed by Roger Adams and sold by William Clayton. Prior to this, however, that town harbored certain printers who attacked the English Church under the title of Martin Marprelate. While the men were working in 1588 upon More Work for the Cooper the press, with the unfinished sheets, was seized by the Earl of Derby and sent to London, while the craftsmen were imprisoned. Since 1719 there has been a continual succession of printers, now amounting to many score, and some with large offices. Newspapers have been very important in this centre, and there are now fifty or sixty periodicals issued there, including several dailies.

Mandar (Sp.).—Said of a page or form which, on account of bad justification, is twisted or from which the letters drop out.

Mandrin (Sp.).—Roller core.

Manecilla (Sp.).—Hand, index (☞).

Manifold Paper.—Carbonized paper, made to be very thin and semi-transparent, and laid between sheets of black paper. By writing upon the topmost of several of such sheets a number of copies is made simultaneously. The writing is done with a stylus or hard pencil with a blunt point.

Manija (Sp.).—Rounce, the wooden part of the crank of a hand-press.

Manilla Paper.—Paper made from old rope, gunny, jute and kindred material. It is very strong and tough, but of a yellowish or yellowish brown color. Inferior grades are made with an admixture of wood and other cheaper stock. One grade known as "bogus" manilla has little or none of the class of fibre from which the best kinds of manilla paper are made.

Maniqui (Sp.).—Scheme or schedule showing the quantity and sorts contained in a given font of type.

Manivelle (Fr.).—The rounce.

Mano (Sp.).—Quire (of paper).

Mantilla (Sp.).—Blanket (of press).

Manubrio (Sp.).—Crank (of press).

Manuscript.—Written words, and therefore written copy for printers. The original writing in the Greek, Latin and Oriental languages was very formal. Every character was large and required considerable time to draw or paint it; but in the fifth or sixth century of the Christian era a less formal method of writing was introduced. As much of the letter was taken as was necessary to identify it and no more. By the tenth century majuscules, or the formal letters, were chiefly used as capitals or for decoration. This was the only method of preserving the knowledge of one generation so that it could be used by the next. In Europe, as late as the second half of the fourteenth century, remarks Hessels, every book (including school and prayer books) and every public and private document, proclamation, bull, letter, &c., was written by hand; all figures and pictures, even playing-cards and images of saints, were drawn with the pen or painted with a brush. In the thirteenth century there already existed a kind of book trade. The organization of universities as well as that of large ecclesiastical establishments was at that time incomplete, especially in Italy, France and Germany, without a staff of scribes and transcribers (scriptores), illuminators, lenders, sellers and custodians of books (stationarii librorum, librarii) and pergamentarii, that is, persons who prepared and sold the vellum or parchment required for books and documents. The books supplied were for the most part legal, theological and educational. They are calculated to have amounted to above one hundred different works. As no book or document was approved unless it had some ornamented and illuminated initials or capital letters there was no want of illuminators. The workmen, scribes and transcribers were, perhaps without exception, calligraphers, and the illuminators for the most part were artists. Beautifully written and richly illuminated manuscripts on vellum became objects of luxury which were eagerly bought and treasured up by princes and people of distinction. Burgundy of the fifteenth century, with its rich literature, its wealthy towns, its love for art and its school of painting, was in this respect the centre of Europe, and the libraries of its dukes at Brussels, Bruges, Antwerp, Ghent, &c., contained more than three thousand beautifully illuminated manuscripts. In speaking of the writing of the manuscripts of the fifteenth and two preceding centuries it is essential to distinguish in each country between at least four different classes of writing, and two of these must be again divided each into two classes. All these different kinds of writing were in the first instance taken as models for such portions of text as were intended to illustrate and explain the figures in block-books, and afterwards as models for the types used in the printing of books and documents.

1. The book hand, that is, the ordinary writing of theological, legal and devotional books, was employed by the official transcribers of the universities and churches. These men had received a more or less learned education, and consequently wrote or transcribed books with a certain pretense of understanding them and of being able to write with greater rapidity than the ordinary calligrapher. Hence their writing may be called the current or cursive book hand, of which a good many illustrations may be found. Quite distinct from this current writing, and much clearer and more distinct, is the upright or set book hand, which was employed by some writers who worked for universities and churches, and also by a good many who may be presumed to have worked in large cities and commercial towns for schools and the people in general without university connection. 2. In the church hand (Gothic or black-letter) were produced transcripts of the Bible, missals, psalters and other works intended for use in churches and private places of worship. This writing we may again subdivide into two classes, the ornamental or calligraphic writing, found exclusively in books intended for use in churches or for the private use of wealthy and distinguished persons, and the ordinary upright or set church hand, employed for less ornamental and less expensive books. 3. The letter hand may be said to be intermediate between the set literary book hand and the set literary church hand, and to differ but little from either. It was employed in all public documents of the nature of a letter. 4. The court or charter hand was used for charters, title-deeds, papal bulls, &c.

Dypold Läber (Lauber), a teacher and transcriber at Hagenau, in Germany, is known to have carried on a busy trade in manuscripts just about the time of the invention of printing. His prospectuses, in handwriting of about the middle of the fifteenth century, announce that whatever books people wish to have, large or small, "geistlich oder weltlich, hübsch gemolt," are all to be found at Dypold Lauber's, the scribe. He had in stock Gesta Romanorum; poetical works (Parcival, Tristan, Freidank): romances of chivalry, Biblical and legendary works (A Rhymed Bible; a Psalter, Latin and German; Episteln und Evangelien durch das Jor, Vita Christy, Das gantze Passional, winterteil und summerteil); devotional books (Die zehn Gebot mit Glosen, small Bette-Bücher), and books for the people (Gute bewehrte Artznien-Bücher, or Gemolte Loss-Bücher, that is, fortune-telling books). The lower educational books consisted for the most part of the Abecedaria, containing the alphabet, the Lord's Prayer, the Creed and one or two prayers; the Donatus, a short Latin grammar extracted from the work of Ælius Donatus, a Roman grammarian of the fourth century, and distinctly mentioned in a school ordinance of Bautzen of 1418; the Doctrinale, a Latin grammar in leonine verse, compiled by Alexander Gallus, a minorite of Brittany of the thirteenth century; the Logic of Petrus Hispanus, used in the teaching of logic and dialectics; and Dionysius Cato's Disticha de Moribus, and its supplement called Facetus, with the Floretus of St. Bernard, used in the teaching of morals. As helps to the clergy in their attempts to educate the lower classes and as a means of assisting and promoting private devotion there were picture-books accompanied with an easy explanatory text, for the most part representations of the mystic relation between the Old and the New Testaments. Among these books the Biblia Pauperum stands first. It represents pictorially the life and passion of Christ, and there exist manuscripts of it as early as the thirteenth century, in some cases beautifully illuminated. A richly illuminated manuscript of it, executed in the Netherlands about 1400, is in the British Museum, and also fragments of one of the fourteenth century. A remodeling and development of this work is the Speculum Humanæ Salvationis, a work in rhyme of the fourteenth century, which in forty-five chapters represents the Bible history interwoven with mariolatry and legend. Of this work the National Library at Paris and Arsenal Library each possess a manuscript composed in 1324, whereas the British Museum has nine manuscripts (six being illuminated) of the fourteenth and fifteenth centuries, written in the Netherlands, Germany, France and England, one bearing the distinct date 1379 and another that of 1436. A work of a similar nature is the Apocalypsis, of which at least two recensions with illustrations may be pointed out. One gives the text as we know it. Other devotional works are the Ars Moriendi and the Antichrist.

The writing of manuscripts did not cease with the introduction of printing. The scribes kept on with their work, which was in many respects superior to the contemporary printing. The greater cheapness of printing, and the absolute conformity of every copy to the first produced, finally caused the cessation of this occupation. Scribes who were brought up to the calling became engrossers for lawyers and copyists for those who did not write a fair hand. Many became printers.

Since the introduction of printing the writing hand of every nation has much changed. It would be impossible for any one to-day to decipher, without special study, the manuscripts of Shakespeare's time. Even within a century there has been a change. The round, fair hand of Washington and Hancock has become very much compressed and distorted, and some letters have acquired new forms, as for instance, the concluding d. The handwriting of to-day is generally bad. For this reason, and on account of the lack of good punctuation and capitalizing, it is regarded in book offices as more difficult work than reprint, and bears a higher price in nearly all scales. In New York this advance is three cents a thousand ems. Unfortunately, employing printers do not generally add enough to the prices which they charge to make up for the extra expense incurred after the work has left the compositor. They ask for the reprint a certain sum, the price of the workman and from two-thirds to seven-eighths added to meet the cost of proof-reading, make-up, superintendence, rent, light and so on; but if the compositor charges three cents more they only add that much, and many employers do not even add this amount. They make the charges for manuscript and reprint the same, yet the difference between the two is very marked. The proof-reader can only correct three-fourths as much in manuscript as reprint in a given time; there is a much greater amount of superintendence; composition moves much more slowly, and the author's return proof will average a week before it is in hand, while on reprint a book can go to press within a day from the time enough matter is on the galleys. Thus in a long-primer book on reprint copy one hundred and fifty pounds is enough for each man employed, while on manuscript a hundred and fifty pounds more must be added to allow for the proofs which are out. In reality, works in manuscript should be charged for at eight to ten cents a thousand more than reprint.

Authors should be asked to make their manuscripts very clear and distinct. They obtain better proofs thereby, as well as facilitate the work. Proper names, if at all uncommon, should be carefully written, and it would be better to have them in print characters. A considerable distance should be left between each of the lines to allow for additions or interlineations, and when a number of alterations are made close to each other, striking out some words here and there and putting in others, it is better to strike out the whole and write in all that is required in one sentence. If a certain page is very bad in this way that page ought to be copied. Manuscript is returned by the author with his first proof, and remains with the printing-office until the work is done and the book is paid for. With the manuscript in the possession of the author or publisher it would be easy to allege errors and ask for deductions in the bill, when the copy could completely disprove the charge. Manuscript is best sent flat. Rolled copy is not desirable. Typewritten manuscript is preferable to that done by hand, as it is clearer. Books are sometimes printed "as manuscript." This indicates that for convenience the author has had the work put into type, not as indicating his latest and best thoughts, or his most complete knowledge, but for convenience and as helping him to remember the details better. It has also the value of being an easy method of obtaining the criticism of friends. George Bancroft, for instance, always put the manuscript of his History of the United States into type as he wrote it, and then used these proofs for the preparation of his copy at a later date. In the meantime the type was distributed.

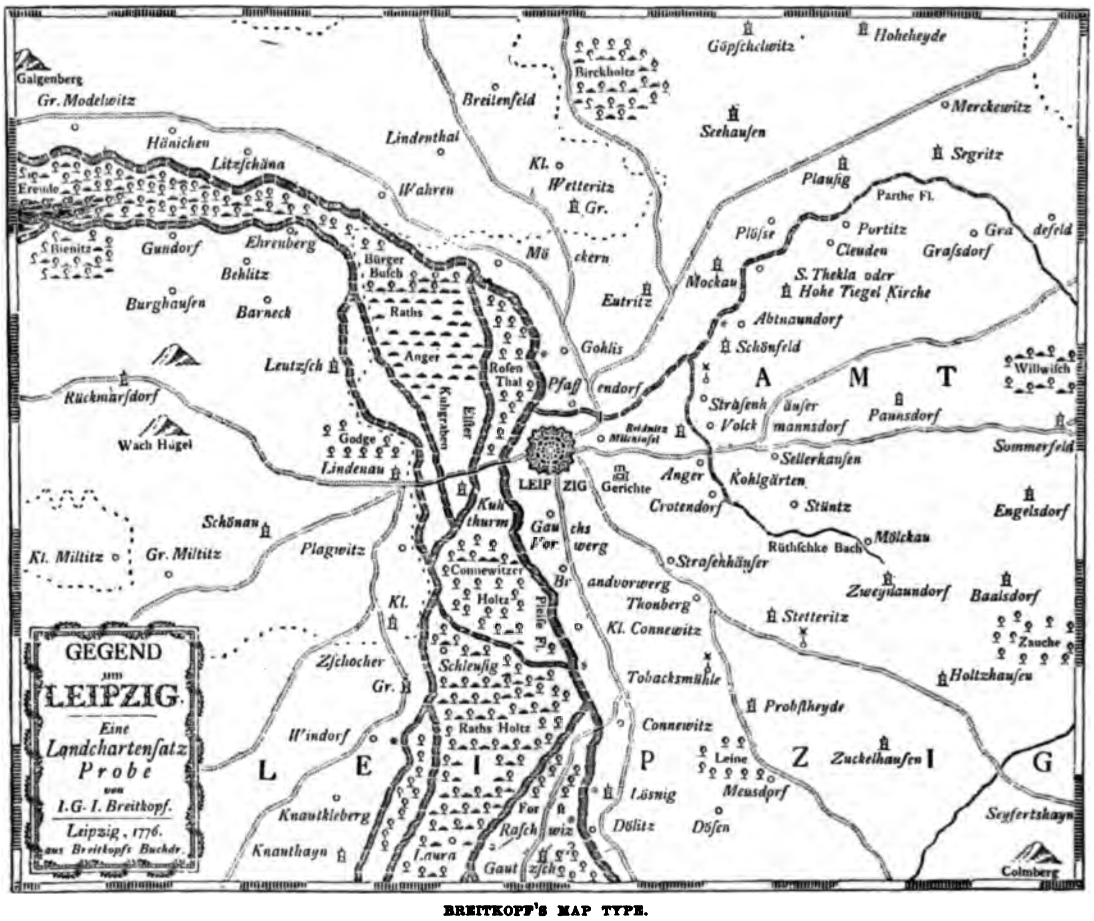
Manuscrit (Fr.).—Manuscript.

Manuskript (Ger.).—Copy, whether manuscript or reprint.

Manutius, Theobaldus, a distinguished printer of Venice. See ALDUS.

Map.—A representation of the surface of the earth or any portion of it, showing its mountains, water-courses and towns, and giving other information. It differs from views in the fact that there is no perspective. Each part is upon the same scale, whatever that may be. The only exception to this is in maps drawn upon Mercator's and some similar projections, where in the effort to represent upon a plane surface a spherical object the polar parts are unduly large as compared with the equatorial. Maps have been in use from the most remote times. It is even probable that they were drawn before writing was invented, as their value would be apparent to any clear-headed man, even if a savage. Eratosthenes reduced map-drawing to a regular system. He introduced into his maps a regular parallel of latitude, which he accomplished by tracing a line over certain places where the longest day was observed to be of the same length. This parallel extended from the Straits of Gibraltar to the mountains of India, passing through the island of Rhodes. Other landmarks were established by later geographers, who were not long in discovering that the earth was a globe, although it was believed to be considerably smaller than we now know it to be. Columbus, for instance, thought that the three thousand miles he was to sail would enable him to reach the eastern shore of Asia. Map making and printing became common at the same time that type printing extended itself, and there are a multitude of good maps in old books. Within the last century many governments have had prepared for them maps of the whole or a portion of the country which they represent, and some of these are on a very minute scale. The survey of Great Britain may be taken as one. In one of the series of maps there published every house or barn in country districts is shown. The best map of any large portion of the United States is that of New Jersey, on the scale of an inch to a mile.

Maps are terrestrial, a portion of the earth's surface being shown upon them; marine, usually known as charts, where the depth of water is given; and celestial, showing the stars and the planetary system, or any part of them. There are also physical maps, exhibiting some facts which cannot easily be shown otherwise. These may be geological, mineralogical, botanical, or in fact of any form. A map could be constructed, for instance, showing the distribution of horses throughout the world or the prevalence of leprosy.



BREITKOPF'S MAP TYPE.

The printing of maps can be done upon any plan, lithographic, copperplate or letter-press, the latter either engraved or process. In lithography the drawing can either be on the stone or on paper, thence being transferred, and in copperplate or steel-plate work the design is incised. The latter is most costly, but at the same time gives the best results, as the faintest lines can be shown as well as the broadest and heaviest marks. It is also the most easily corrected. Lithography is the cheapest practical method of getting good maps, many of which are of excellent quality. Process work is indistinct and is difficult to print rapidly on ordinary paper. One method of making maps is that known as the wax process, in which a plate of glass or highly polished metal is covered with a coating of wax. Upon it a design is drawn, and either by a needle or graver the lines are cut through to the glass. Letters are made by stamping directly through the coating with type. An electrotype is made from this, the part touching the glass being on the face of the electrotype. The method used in Rand, McNally & Co.'s, in Chicago, the largest house of this kind in America, is to take a steel plate, upon which wax is laid. The room is heated to ninety degrees, which is necessary in order to render the wax sufficiently pliable. It is a composition of beeswax and some hardening materials. The coating spread upon the plate is in some cases of no greater thickness than a sheet of paper, but in others it is the eighth of an inch. Pen-and-ink drawings of the work to be executed are given to the operators. The hair-lines are drawn with sharp-pointed instruments by the aid of straight-edges. The dotted lines indicating county or township boundaries are made with little wheels, on whose narrow edges are cut the figure to be impressed. All crooked lines are made by hand and require an artist's eye. The names of towns, rivers and countries are stamped into the wax with type, letter by letter. Every impression must cut through the wax to the polished steel plate beneath, for the map is made face down. When all of the lines and letters are ready the wax is placed under a cooler temperature, which hardens it. The wax is then covered with black-lead, and the steel plate with its waxen coat is suspended in an electrotyping solution. Where the material has been cut through is the face of the map.

Reinhold's method is to take a polished copperplate and coat it with a solution of sulphite of potassium in order to get a thin film of oxide on the surface of the plate. Otherwise the copper from the electric current will deposit directly against the plate and form a part of it. Four ounces of white beeswax, a quarter of an ounce of Venetian pitch and one ounce of oxide of zinc are mixed together and put in a hot place to melt, being constantly stirred. The copperplate is laid on a hot stove, which must be level, and after the plate is well heated some of the prepared wax is placed in the centre. It spreads all over, and should be made to do so evenly with a comb. Then the plate and wax are taken off and allowed to get cold. The coating must be thin. The drawing to be reproduced can be transferred to the wax by means of transfer-paper or by photography. The engraving is executed by sewing-machine needles ground around the tip. Rules are used where there are straight lines. The stamping of letters should take place while the plate is warm; the wax should become tender, but it should not be hot enough to melt. An electrotype is then made, blank spaces having been previously built up.

In ordinary letter-press the electrotype plates employed are of two kinds. There is the outline in black, and the other blocks in colors. If it is desired, for instance, to print the north-eastern corner of the United States in colors, Maine might be represented in yellow, New Hampshire in red, Vermont in green, Massachusetts in dark brown and Rhode Island in yellow. The yellow used on Maine would not conflict with the use of the same color in Rhode Island. Neither would there be any difficulty with having Connecticut in the same color as New Hampshire. The western line of New England would therefore consist of Vermont in green, Massachusetts in dark brown and Connecticut in red. New York would require some color which would contrast with all three. This might be in yellow, but there is a part of Long Island very near to Rhode Island which would make it seem as if the latter State were a part of New York. It would consequently be better to put New York in blue. Thus it will be seen that four or five colors are required. If the tinting is done on the press the form must go on four or five times, in addition to once for the outline. In this case it has generally been found expedient to have some light lines drawn in a different way for each color, as giving more plainness to the design. It marks the difference very emphatically. Much of the work of this kind is done by stencils. There is a different stencil for each color, and a large number of sheets can be made ready in an hour. Water-colors can be employed in this.

Map Type.—It has always been thought by compositors that if a way could be devised for casting map type in such a manner that the different characters could be joined, it would be a great advantage to the printing community. But the difficulties to be encountered are too great to give a really satisfactory result. A little over a hundred years ago Breitkopf & Härtel in Leipsic brought out a map composed with type cast on purpose, a reproduction of which is shown on a slightly smaller scale. A careful examination of it will show the details, as the joinings of the lines are easy to be discovered. It is apparently all type and justified with type, the slight deviations which exist in parallelism probably being occasioned where the characters bound against each other. Near these places pieces of paper and thin wooden wedges were applied to make the form lift. The necessity of having such characters has passed away with the introduction of process printing. Such a map would take a man three or four days to set after it was drawn; by process it could be immediately copied. A little more care would be necessary in the lettering only. Map type is made by one foundry in the United States, but of a plainer and ruder character than given by Breitkopf.

Mappa, Adam Gérard, the earliest type-founder of New York, was baptized in the Reformed Church at Doornick, in Hainault, a province of Belgium, on December 1, 1754. He was the son of Adam Corneille Mappa and Sophia Termeulen. He entered the military service when a boy of about fourteen, and on June 23, 1768, he was gazetted as ensign in the First Regiment Orange-Nassau. He became lieutenant on January 31, 1771, and left the army in October, 1780. About that time he married Anne Adriana Paspoort, who bore him four children. He was a deacon in the Walloon Church at Delft in the years 1783 and 1784. While still in service at Groningen Mappa bought the most considerable part of the type-foundry of Voskens & Clerk, at Amsterdam, paying for it at a valuation for the whole of 18,000 francs. He had the intention of associating with himself Wybo Tijnje, a newspaper publisher at Delft, and it is thought that the partnership was carried into effect. There were important political troubles in Holland in 1787, in which Mappa took an important part, and it is believed that they forced him to come to this country. In 1792 his name appears in the New York Directory as carrying on business in that city as a type-founder at No. 22 Greenwich street. His business was evidently not very large, and in 1795, when Binny & Ronaldson proposed to begin their foundry in Philadelphia, he entered their employment, remaining with them several years. MacKellar, Smiths & Jordan have still a specimen-book of his production in Holland, which in many faces shows an absolute identity with the earlier work of their foundry. The type is rude and much of it is badly cut. About 1800 he went into the service of the Holland Land Company, which at that time owned a very large portion of the land of Western New York and Western Pennsylvania, and in time became its general agent at Trenton, N. Y. This company purchased the land from New York State very soon after the close of the Revolution and divided it for sale. Mappa died on April 15, 1828.

Máquina (Sp.).—Machine; applied in printing to all presses other than hand-presses. They are distinguished as máquinas sencillas, single or common cylinder; dobles or de retiración, double cylinder or perfecting; de reacción, which print two sheets at once; rotativas, revolving cylinder or web presses. Máquina de plegar, folding-machine.

Maquinista (Sp.).—Cylinder or machine pressman.

Marbled Edges.—The cut edges of books after being marbled.

Marbled Paper.—Paper upon which color has been placed, in imitation of marbling, or which really has been marbled.

Marbler.—One who marbles paper and the edges of books.

Marbling.—A method of decorating sheets of paper or edges of books by dipping them into a vat upon which has previously been sprinkled a variety of colors, which form a sort of pattern. These colors can be of any kind, from the loudest and brightest known down to the palest and mildest. The chief use of this art in printing is in decorating the interior of the covers of a book and that part of the two pages which faces them, but it is also used for the edges and sometimes for the outside of the covers. It is said that marbling was known as early as the year 1600, and that Mace Ruette, a bookseller and bookbinder of Paris, is responsible for its development there. The Abbé du Seuil was famous about this time for his good marbling, and in 1641 Le Gascon used what was then spoken of as the "new and much admired discovery." The art became common in France one hundred and fifty years ago. Holland and England employed the discovery almost from its beginning. It is a very pleasing style of ornament, and does not seem likely to be driven out by any new discoveries.

The peculiar appearance of marbling is due to the fact that the drops of color float upon the surface of the bath, but do not coalesce, although they can be drawn out or intermingled. This is on account of the peculiar preparation of the colors and to the fact that when they rest upon water with which a size has been mixed they will float. All kinds of vegetable and mineral colors are utilized, with the exception that the mercurial pigments and some of the others are so heavy that their employment is impracticable. A trough is prepared larger than any sheet of paper which is likely to be dipped into it. A good size for a bindery which does not have much of this work is two and a half inches deep, and double the length and width of the sheets to be dipped in it. The principal portion of the liquid used is water. This is mixed with decoctions of fleaseed, gum tragacanth, slippery elm bark and linseed. The strongest is fleaseed. Put a quarter of a pound of seed into a crock and pour upon it a gallon of boiling water. Stir it for ten minutes, then put it aside for half an hour and repeat the stirring. In another half an hour add another gallon of water, and stir at intervals during another hour, when it should be set aside to cool. When cold the mucilage is strained off. It must not be stirred when cold or nearly so, as that prevents the seed from settling to the bottom, as it should. Linseed is much used for this purpose. The seed should be soaked over night in rain-water and then simmered over a slow fire for five or six hours, being stirred at intervals and closely watched. A moderate heat is enough to extract the mucilage, but does not throw out the oil. Three gallons of water are used to a pint of linseed. The most important gum for this purpose is gum tragacanth. The best is the clearest in appearance, and the solution is the most transparent. Cut a cask in two, and put into one part two pounds of tragacanth. Upon this several quarts of water are poured. The next morning it should be well stirred, so that the lumps of swollen gum may be broken. This should be done for two or three consecutive days at least, at intervals, and water must be added, as gum thickens or absorbs it. Small quantities can be prepared in ordinary jars, such as housewives use for putting up fruit. A few flakes can be put into each, and the remainder filled with water. In a few days it will be ready, the jar having been shaken at intervals. Gum hog is newer than the other substances used, having first been imported into the United States about the year 1850. It does not become a mucilage when water alone is applied to it, but requires heat and alkali in addition to effect the object. It contains both an acid and an astringent principle, and these must be removed as much as possible before placing the gum under the influence of heat. A clean vessel is selected, into which half a pailful of rain-water and a pound of gum hog have been placed. After it has swelled up the superfluous water should be removed and a fresh lot added, and after a short time this can be taken away. By this means the greater part of the astringency and acidity is removed, and the gum is ready to receive half a pound of sal soda and a quarter of a pound of borax, with enough water to permit the whole to be simmered over a slow fire for three or four hours and constantly stirred to prevent burning. At this time the operation is complete. The gum may be very thick, but can be reduced by the addition of water when wanted. Carragheen moss and slippery elm also have been used for a basis, and German marblers have tried mercury, which holds up the colors mechanically. The moss and slippery elm are prepared by steeping.

The colors are obtained already ground, or are ground in an ordinary color-mill. They must be in a very fine state of division to be used with much success. They are mixed with water to a thin paste or pulp and twice ground, the second time any other substance necessary is mixed in, as turpentine, gall or gum. Beeswax, shellac and gum arabic are used in combination with the colors in order to give them stability when undergoing the process of burnishing. The quantity of each must be small. Gall is employed to cause the colors to float above the mucilaginous basis and not intermix with it. It is this which gives the distinctness to each of the various hues. Two tablespoonfuls of gall can be added to one pint of color pulp. A little alum is used to counteract this substance when by accident too much of it has been used. The next stage in marbling is to dip the brush into the pot containing a particular color, and sprinkle it over the face of the liquid. When as much has been used of one color as is desirable another color is taken, and so on until the requisite variety has been obtained. When the drops first fall upon the water they are round and flat, but the longer they remain the larger they grow, until they meet another drop similarly expanding. This movement is slow, and where, for instance, a red has first been used and a blue follows, the blue drops will to a great extent separate the red ones. If a blue drop strikes the centre of a red drop it forms the centre of a ring, the red encircling it on all sides. If it touches the edge the spherical shape of the last thrown in is preserved pretty closely, but the first sprinkled yields to it. The third makes room for itself in like manner, and so on to the end. The colors remain perfectly distinct. The last deposited has the most perfect form, the first employed only filling interstices.

The pots contain a small portion of coloring matter, little more than enough to cover their bottom. If there were more too much would be taken up by the brushes. The brushes themselves are of somewhat peculiar form, the bristles extending laterally more than is customary. When the surface of the liquid in the tank is ready to receive the sprinkling the workman takes one of the brushes and rolls it between his hands by the handle before he takes it out of the pot, in order to throw off the superfluous coloring from it. Different brushes are used for different pots.

In addition to the figure directly produced by the sprinkling, others are imparted by combs or rakes. A comb is passed steadily and in one direction over the liquid, the teeth of the comb, which are of wire, touching the colors. Thus the color figures are elongated. This process can be repeated, or the comb can be used transversely or diagonally. A large comb or rake will make a greater change where the teeth touch. If, after doing this, another color is sprinkled on and a different kind of combing used a very material change is witnessed. There are many special devices known to marblers.

When the sprinkled surface is ready the workman takes a sheet of white paper and lays it carefully down upon the liquid, beginning at one corner, and letting it carefully down until it lies wholly on the liquid. If the tank is large enough to receive a second sheet he applies that. The two sheets are then taken up, one after another, when it is found that the beautifully variegated colors which have been floating on the liquid have been wholly transferred to the sheets. They have been taken up by the paper, and so completely absorbed, too, into the substance of it that the surface, all wet and dripping as it is, may be rubbed with the finger without in any degree disturbing the colors. The sheets as they are lifted are laid across a wooden rod and hung upon a frame near by to drain and dry.

The last process is burnishing. This is produced by means of a piece of polished flint or agate, which passes rapidly to and fro over the surface of the paper, the sheet being held for the purpose upon a sort of bed prepared for it to lie upon on a very solid bench or table. The burnisher is attached to the end of a long lever which hangs from the ceiling or from a strong support. At the upper end of the lever is a joint by means of which the lower end may be moved. The burnisher is vibrated by machinery very rapidly over the surface of the paper. As the process of burnishing goes on the operator draws the sheet forward by a very slow and careful motion, so as to subject all parts of it in succession to the polishing effect of the friction. The operator in holding the sheet begins in the middle of it, and works first towards the farther side by drawing the sheet gently forward as the process goes on. The sheet is then turned and the second half is done. Hand-burnishing is practically the same, except that power is not used. Books are marbled at their edges, a number at a time, before they are rounded, but after they are cut.

rbre (Fr.).—Originally the stone forming the bed
nd-press, but now an imposing-stone.

rcador (Sp.).—Feed-board of machine press; also
eeder.

rcar (Sp.).—To feed sheets to a press.

rge (Fr.).—Margin.

rgen (Sp.).—Margin.

rgin.—Making margin is the apportioning of the
space between the pages of a sheet and conse-
y of a form. This is a most important matter in
ork, for if it is not properly done the appearance
ook when completed will be injured, as the binder
obliged either to reduce the size of the book, in
o make the edges smooth, or else he will have to
any raw edges of paper. The spaces between the
should be such that when the book is bound and
page of printing shall be very nearly in the mid-
the page of paper. Convenience and custom have
rized us to the printed page being a little higher
e middle of the leaf, and to its having a little more
at the fore edge than at the back. The first of
ircumstances may be accounted for by the head
izes except folio being at the fold of the paper,
permits the bookbinder to cut it smooth by taking
ery narrow shaving, so as to reduce the size a mere
The bottom of the page was very frequently short
w in the days when there was no machine-made
In paper intended to be used on the same book
eet was often an inch shorter or narrower than
r, which on an octavo would make a page from a
r to half an inch shorter or narrower. Frequently,
e paper was not square and needed to be trimmed.
a good book the pages must be thrown away from
ge. Thus a taste has been formed in all countries
ing a book a trifle above the centre and somewhat
to the back than a true theory would suggest, and
stom, originally begun because of defective paper,
y to be permanent.
margin of a book is largely regulated by the qual-
a work. The more elaborate and expensive it is,
e less distinctly utilitarian, the greater the margin
e greater the impulse to give much space compar-
at the lower edge and fore edge. The ordinary
ents from the Congressional Printing-Office are on
avo page, which uncut measures six by nine and a
ches; the matter is seven and three-quarter inches
nd four and seven-eighths inches in width. The
margin, therefore, if perfectly equal on each end,
be seven-eighths of an inch, from which must be
ted the cutting, which appears to be a quarter of
h on each end. The matter on the page bears a
rtion to the whole surface of the leaf of a little more
wo to three. Taking a book of the class next
or, the essays on historical and social science pub-
by the Johns Hopkins University, the paper page
he same size as the former, six inches by nine and
; but the printed matter is only six inches and a
y three and three-quarters. Thus the margins are
nches up and down and two and a quarter inches
The widest margin, if perfectly equal, would be
h and a half, from which should be deducted a
r of an inch for half of the shaving. In the former
the fore edge when cut had less margin than the
while the bottom was only about a long primer
than the top; but in the Johns Hopkins book,
the margins were at the back, one inch; the top,
h and a quarter; the side, an inch and a quarter,
e bottom two inches and an eighth. The printed
was in proportion to the entire size of the leaf as
s to seven. In a memorial of William E. Dodge,
in New York, where a still better grade of print-
s attempted, the leaf was of the same size as the
two, but the matter only covered an area of six
and a quarter by three inches and a third. The
proportion therefore of the printed matter to the leaf was as three to eight. The top and bottom margins were three and a quarter inches; the back and the fore edge were two and two-thirds inches. The widest margin would be at the foot, where two and a quarter inches would be given untrimmed.

It is therefore evident that a wide difference must be made in the margins of books. Those of luxury need a wide framing of white around the page of type; those for everyday use and for containing much matter have as little as possible. The example first given is too compact for general use. The documents issued by the general government are long, and it is desirable to print them at as little expense as possible. Another point to be considered is that they are transitory. Few are preserved. On the other hand, the Johns Hopkins publication does not utilize the leaf as much as is desirable on most works, and the memorial of Mr. Dodge was intended for circulation only among his friends. The family was rich and desired the work well done. Therefore the page was small, the presswork careful and the paper excellent. The true margin for a book, neither compelled to be shorn of its proper proportions for economy's sake, nor designed to be more expensive than is necessary, is such that the type page will compare with the leaf in the proportion of one to two. If the leaf has sixty-four square inches of surface the page should have thirty-two; if the leaf covers forty square inches the type should cover twenty. This is the happy medium between too much margin and too little. As laid down in De Vinne's Price-List, the various sizes of leaf and page commonly in use are as follows, in inches:

NAME.	Size of Page of Type.	Size of Leaf.
Medium 32mo	2 × 3⅜	3 × 4¾
Medium 24mo	2⅛ × 4	3⅝ × 5½
Medium 18mo	2⅝ × 4⅝	4 × 6½
Medium 16mo	3⅛ × 4¾	4½ × 6¾
Medium 12mo	3½ × 5½	5½ × 7⅝
Crown Octavo	3⅝ × 5¾	5½ × 8¼
Medium Octavo	4 × 7	6 × 9½
Super-Royal Octavo	4½ × 7⅝	7 × 10½
Imperial Octavo	4¾ × 9	8 × 12

Leaded matter should have rather a smaller page; solid matter a rather larger. Double-leaded pages would be still smaller. Southward in his Practical Printing lays down a rule for the difference to be made in pages when they are solid, single leaded, double leaded or triple leaded. Taking the size of the leaf at 100, the respective proportions of the type page are to it as 60, 49, 39 and 31, and the outer margins are five-eighths and seven-eighths of an inch, an inch and an eighth, and an inch and three-eighths.

When a new sheet is to be imposed the margin should be made up on a sheet of exactly the right size. The paper should be folded until the proper dimensions are reached, and then the position which the type page is to assume is to be marked on the first page. This should be done with much care and deliberation. The type should neither be too high nor too near the back, but inclining towards both of these positions. When decided upon lay the folded sheet down flat upon a board and drive a bodkin down through it at each corner. When the sheet is unfolded it will show the place of every page, with the margins of their accurate dimensions. This plan can be followed with every size and shape of regular form, allowance being made for the thickness of the folds when many come together.

When this method of making margin is objected to the pages are laid down so that four of them will come together. The sheet is folded and then unfolded and laid down over the type, the creases coming exactly in the centre between the pages. Upon the sheet have previously been marked with the compass the two pages which are at the front and back, a line being drawn with a lead-pencil to show the position of each of them. This shows the margin at the back of each pair of pages, if they are measured from one to another, and the same process at the heads gives the measurement there. Move the pages until they exactly conform with the creases and the page diagram, then repeat this process for the interior bottom and fore-edge margins. The paper, of course, will cover all of the pages and more, so that the make-up has nothing to do except to regulate the inside margins. When these are adjusted with the pages of type furniture can be fitted in, but it should not be cut until the whole is regulated. The proper size is ascertained by fitting in pieces between the metal of the pages, but it can be done as well on the paper if the punctures have been made. The type is then untied and the matter is closed up.

In ordinary matter a full-sized page should be a quarter of an inch nearer to the back than the front, the top having enough more, so that when cut it shall appear to be the same as the back. The binder will probably cut off about a quarter of an inch at each cut, and this difference in margin is necessary to restore the equality of the page. The greater the size of the page and the more elaborate the work the greater the disproportion. On such work a rule has been devised giving the back the dimensions of two parts, the top of three, the fore edge of four and the bottom of five. Supposing these to be half inches, the page would be an inch from the back, two and a half from the bottom, two from the side, and one and a half from the top. If this were an ordinary page of double medium in long-primer type the size of the type page would be three inches wide by five and a half long. It would cover two-sevenths of the area, and would contain 943 ems, but the page of type would be deformed. It would not have the proper proportions. It would be better to shorten it somewhat, so as to diminish the length nearly half an inch, and the paper in proportion; but the same result could be attained by taking a sheet of paper three inches wider, making it 27 by 38. These various copies are known as large paper copies, and are usually printed only four or eight pages at a time. The page can be very diminutive in proportion to the leaf, the size being only one-fifth or one-sixth, and the proportions are often determined differently, the outer and lower edges being twice the width of the upper and inner. Great pains should be taken to make all of the pages square to each other, with the same margin everywhere in like places. The bending or distortion of chases or crossbars will frequently throw matter out of register if the make-up is guided only by their edges. They may be thicker or thinner in some places than they should be. If only a single form is to be printed, saw a piece of furniture just a little wider than the distance between the pages which are companions, and then cut it down somewhat so that it shall be a tight fit. Try this everywhere, and do so with other pieces at the heads, the feet and the outer margins if there are enough pages for them to come together. If there are to be a number of forms make a gauge with notches. It is well to take a press proof on an important book, back it and fold it, and then examine the margin to see whether it looks altogether right.

The margins of dictionaries and other books in triple columns and the margins of newspapers and periodicals are not governed by these rules. The inside margin of a newspaper is usually five-eighths of an inch, that being the thickness of the chase, but occasionally a greater margin is demanded. An inch is regarded as an ample outside margin. Large books which are thus printed for the sake of economy have no set rules as to margins. Enough is given at the back to allow the sewing to be properly done, and enough is given at the outer edges to permit the binder to take off a shaving and still have a little white paper. In cheap books bound with wire through the sides it is usual to leave one-quarter inch more back margin.

On this subject Mr. De Vinne lays down the following rules:

"Never impose a form of more than twelve pages without finding out whether the form should be in two or more sections. For paper of ordinary thickness sixteen pages may be put into one section; for very thick paper the section should be of eight or four pages. Forms of twenty-four pages in one section should have the back margins of the central eight pages made smaller than the back margins of other pages in the form. Always know the exact size of the paper before you begin to make margins. If the paper is not to be trimmed make it up to the size in inches by which it is described and sold. Do not make it up to an accidentally selected sheet, which may be too long or too short. If paper is to be wet find out from the pressroom or warehouse how much it will probably stretch in wetting, and allow for the increased size. Find out also whether the proposed form of pamphlet will be cut or uncut as to margins; whether it will be sewed or side stitched; whether it will be bound in a stiff cloth case or in a plain paper cover. If it is to be side stitched or bound in a stiff cloth case allow more margin in the back than you would for a sewed, uncut and paper-covered pamphlet. If the pamphlet must be trimmed to a fixed size be sure to allow enough of blank for what will be cut off. Always make up margins full to fill the paper, so that the printed sheet can be truly folded by regularly even folds of the paper. Make sure always that each side margin on the outer edge of the printed sheet is exactly one-half of the broad inner margin nearest the crossbars. Verify this in 16mo forms by folding a sheet of the paper in quarto and using it as a measure from any other point in another quarter. If it does not tally the margins are not right. Never send a form to press with unbalanced margins, which will compel the binder to cut off waste before he begins to fold."

Marginal Notes.—Usually called side-notes; sometimes incut or let into the matter at the side. Their space is usually abstracted from the margin, which accordingly must be generous. They are usually set in nonpareil.

Marginales (citas) (Sp.).—Marginal notes.

Marginalien (Ger.).—Side or marginal notes.

Margine (Ital.).—Margin.

Marinoni, Hippolyte, a celebrated press-builder in Paris, was born in that city on September 7, 1823. He attended school until eleven years of age, when he entered a machine-shop. Afterwards he had experience as a type-founder and pressman. When only twenty years of age he engaged in manufacturing presses, then becoming manager for Gaveaux, who was building machines. In 1848 he constructed a four-cylinder machine of the type familiar to Americans as Hoe's lightning presses. Two years afterwards, with two colleagues, he started a machine-shop in the rue Vaugirard, which soon passed into the possession of Marinoni alone. He removed to his present large manufactory in 1877. His inventions have been very numerous. They include a folding-machine, brought out in 1850, and improvements in hydraulic presses and lithographic presses. In 1872 he made the first French web press, which has proved satisfactory, many improvements having been added. Over forty-five patents have been granted his house for inventions in typographic and lithographic presses. The line of printing machinery made by him is the most complete in Europe, and shows great inventive skill. In 1875 he became a knight of the Legion of Honor, and in 1878 he received further promotion in that order.

Marking-Ink.—Indelible ink, used for the purpose of marking linen, &c.

Marking Up.—When the back of a book is being marked for flexible sewing.

Marks of Correction.—The corrections and alterations marked on a proof-sheet. See PROOF-READING.

Marks of Reference.—Signs of various kinds used for notes. Sometimes superior figures or letters are so used. See REFERENCE MARKS.

Marmo (Ital.).—An imposing-stone.

Mármol (Sp.).—Imposing-stone; formerly also applied to the bed of a hand-press, which at first consisted of a marble slab.

Marmosete (Sp.).—Allegorical cut.

Maroquin (Fr.).—Morocco.

Marque à Couper (Fr.).—The line where copy is cut off.

Marquer (Fr.).—To mark.

Marteau (Fr.).—A hammer.

Marthens, John F., a printer of Pittsburg, born in that city on August 23, 1830, went to the printing trade at eleven years of age, his father having been a printer before him. He has been an enthusiastic collector of works relating to printing, and published a journal called the Quadrat, which had in it many valuable and interesting things relative to the art. In 1875 he compiled a Bibliography of Printing, the first ever issued. He carried on business for himself for some time, but is now the superintendent of the establishment of Joseph Eichbaum & Co.

Martillo (Sp.).—Hammer.

Martin, William, the brother of Robert Martin, Baskerville's apprentice and successor, acquired much reputation as a letter-founder in connection with the types he furnished the Shakespeare Press after 1790. He was first employed at the Birmingham foundry, and then entered the service of William Nicol as a punch-cutter. He died in 1815.

Martin, William Cook, at the time of his death the oldest employing printer in New York, and the president of its Typothetæ for seven years, was the son of a physician and born in New Jersey on January 12, 1811. He entered the printing-office of John C. Totten, at 9 Bowery, in 1822. His time was served both at press and case. He wrought as a journeyman for some time in New York and in Philadelphia, beginning business permanently for himself in 1835, although he had some little time before made the same experiment in vain. His partner in the new venture, who was a stationer, became involved and failed a year or so after, and Mr. Martin assumed the entire liabilities of the printing-office. After years of economy and hard work he succeeded in paying off its debts. He early distinguished himself by the neatness and taste of his work, and his business soon became profitable. His office was located at 111 John street, New York, for over forty years. He was a member of the original Typothetæ, and chairman of the printers at their meeting in the Astor House in 1872, and on the reorganization of the Typothetæ in 1883 was chosen its president, a position he held until his death. He was a delegate to the printers' convention in Chicago in 1887, together with R. Harmer Smith and Howard Lockwood, and had much to do with shaping the organization of the United Typothetæ, which was then brought into existence. He was a delegate to each of the succeeding meetings, that in Boston being the last. In 1885 he celebrated the fiftieth anniversary of his entrance into business by a dinner at the Brunswick Hotel, where he made a speech giving many particulars of his life and noting many improvements in the art since he began as a workman. He maintained his strength and his attention to his calling until within a few weeks of his death, which happened on May 4, 1891. By his will he bequeathed a sum of money to the library of the New York Typothetæ, and to this his family added a number of books, medals and a bronze bust of Gutenberg, which had originally been presented to him by the printers. It is believed that he was longer an employing printer in New York than any other person who ever carried on business there.

WILLIAM COOK MARTIN.

Mary.—If none of the nicks appears uppermost in throwing or jeffing with quadrats the throw is called a Mary.—*Jacobi.*

Maryland.—One of the United States. It was one of those in which the art of printing was exercised before the Revolution, it having been begun by William Goddard in 1773 at Baltimore, and by William Parks in 1727 at Annapolis. Jonas Green was also a printer at Annapolis from 1745. With the exception of Baltimore there are no large cities in the State, and that city has never been the seat of a large publishing industry. It has many printing-offices, but most are upon a small scale. The total number of newspapers published in the State in 1810 was 21; in 1840, 45; 1850, 68; 1860, 57; 1870, 88; 1880, 143; 1890, 178. In 1880 there were 15 dailies and 128 other publications, and in 1890 there were 14 dailies and 164 other newspapers and magazines. There are three type-foundries in this State and one printing-press manufactory.

Massachusetts.—One of the New England States, and the British colony into which was first introduced the art of printing. This was at Cambridge. Harvard College then needed a press, and it was thought that if one were established there it would do a valuable work in converting the Indians. The funds for the purchase of this press were contributed or collected by the Rev. Joss Glover, a Dissenting minister, who died on the voyage across the Atlantic in 1638, and the work was begun in Cambridge by the college authorities under control of the Rev. Henry Dunster, who married Glover's widow. The actual workman was Stephen Daye, who in time was superseded by Samuel Green, who with his family continued work there for more than sixty years after the arrival of the types. Boston, however, was growing very rapidly, and in 1676 a printing-office was begun there. It was soon followed by others, and by the year 1720 its press was surpassed in fertility only by London and one or two other towns under the English crown. The first Boston printer was John Foster, who was succeeded by Sewall, Glen, Green and Pierce. Printing stopped in Cambridge soon after 1702, when Samuel Green died. The art was diligently pursued in Boston during the colonial era, and the city remained during all that time the chief centre of publishing activity. One copy of a newspaper was issued there in 1690, but further publication was forbidden by the authorities. In 1704 the Boston News-Letter was issued; in 1719 the Boston Gazette, and in 1721 the New England Courant. It was in the office of this latter journal, conducted by James Franklin, that Benjamin Franklin served his time, and there he began writing for the public. Booksellers began to appear in Boston in 1652, and more book-stores were maintained in that one town than in all of the others in New England, New York and New Jersey collectively. Michelson, whose other name is not known, attempted to start a type-foundry in Boston in 1768, but was unsuccessful. All type was then imported from Great Britain, as were well-made printing-presses and good ink, though Rogers & Fowle, in Boston, were an exception about 1750. A paper-mill was erected at Milton about 1730, and in 1770 there were three small mills in all. At the time of the Revolutionary outbreak there were five newspapers published in Boston, and six or seven distinct printers. Up to the year 1765 there had been established in the colonies forty-three newspapers, of which Massachusetts had eleven. Four were existing in 1754, and seven in 1775. Other towns in which printing was carried on before or during the Revolution were Salem, Newburyport and Worcester, and immediately after Northampton, Pittsfield, Stockbridge, Greenfield and Leominster. All of these were before 1800. Printing sprang up with activity as soon as peace returned, and Boston and Worcester in particular did much publishing. In the latter city Isaiah Thomas, the largest publisher of his day, and entitled by a French traveler the Didot of America, issued the Scriptures in many forms. He was an early American music printer from type and the first who published an entire book in Greek. A peculiar feature of the half century following 1790 was the printing of standard books, such as histories, concordances and commentaries, in little villages throughout this State on orders from New York or Boston booksellers, but occasionally on their own account. Andover for very many years kept up an establishment of this kind, where work was executed in Oriental languages when necessary. In later years Massachusetts has been a very active book-publishing region, this being very largely due to the fact that Harvard College is located there and there are many resident authors in Boston. Capital is abundant and labor efficient. In job printing much is now turned out in Springfield, Worcester and Boston, and in the latter city there is much lithographic and steel-plate work. Type-founding has been carried on since 1816, and bookbinding is an important industry. Massachusetts is the most important State in paper-making, value of product considered.

Newspapers are now published in every county of this State. The whole number in 1810 was 32; in 1840, 91; 1850, 209; 1860, 222; 1870, 259; 1880, 427; 1890, 685. Those issued in 1880 were 39 dailies, all others being 388; in 1890, 57 dailies and 628 other periodicals. Of these 240 are in Boston. Other principal newspaper-publishing cities are Worcester, Lowell and Springfield. The State stood in 1890 the ninth in number of different periodicals published, and the fourth in amount of aggregate number of copies circulated each issue, being one-fifteenth of the whole, although the area of the State is only one four-hundredth of the whole and its population a fortieth.

Master Printer.—The employer and head of a printing-office.

Mater (Ger.).—The nut of a screw.

Materia (Sp.).—Matter. In Spanish, applied to the text of a work when this has notes or references. Sometimes also roller composition.

Materia (Ital.).—The mixture of lead and antimony which is used in type metal.

Material.—The collective tools and machinery of a printing-office, called plant in England. Within a few years this term has also been introduced into America.

Materiale (Ital.).—The totality of type, presses and other stock which composes a printing-office.

Mathematical Signs.—Various characters used in relation to mathematics. See ALGEBRA.

Matrice (Fr.).—Matrix.

Matrix.—The sunken molds in which type is cast, produced by an impression from a punch. See TYPE-FOUNDING. It is also the mold made from a page of type in stereotyping or electrotyping. The plural is matrices, but it is frequently used as matrixes.

Matriz (Sp.).—Matrix; form or engraving used for electrotyping or stereotyping.

Matter.—The series of the discourse of the compositor's copy; also the letter, when composed, is called matter.—*Stower.*

Mayúscula (Sp.).—Capital letter.

Mazarin Bible.—The Bible of forty-two lines, which was discovered in the library of Cardinal Mazarin two hundred years after the printing. It was not then known that there was another edition of the Bible of about the same date. More than twenty copies of this edition, seven being in vellum, have since been found.

Mazo (Sp.).—Mallet.

Mazorral (Sp.).—Solid matter, with few breaks or blank-lines.

Mazzuola (Ital.).—A mallet.

Measure.—The width of a page or column in the type portion. To gauge a measure unscrew the stick, move the knee up or down until the stick holds exactly the measure, and then secure the knee in position. The French and German words applied to this also mean to justify, which is never used in America except to express the proper hardness of a line. Measures are generally made in book offices to pica ems, but sometimes in narrow or double-column matter an en is used in addition. These will not match exactly to other sizes of type. On narrow measures the compositor is entitled to an allowance of two or three cents a thousand ems. This would be applicable to measures below sixteen or seventeen ems of the size of type used, but if below thirteen the work should be done on time, as the compositor will have too much trouble with his matter. The narrowest measure in greatest use is sixteen or seventeen ems of long primer on country papers; the widest is foolscap, or thirty-eight ems of pica. Half measure is where the measure is divided into two for convenience in tabular work; scant half measure is where an allowance has been made for a column rule or reglet to go between the two parts. Third measure is when a third of the total is taken, and scant third measure is where, in making up the stick, an allowance is made for two column rules or reglets. Thus in a measure of thirty-three ems of brevier third measure would be eleven ems. If the rules were of the thickness of six to pica two would be equal to a third of a pica, or two-thirds of a nonpareil. Deducting these there would be about thirty-two ems and an en to be divided into three parts, each of these then being ten ems and four five-em spaces. Measures should always be set from gauges when possible. If in ems the letter m is turned sidewise, as:

ΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞΞ

Commonly, however, this is done from leads or from leaded matter. If with m's or quadrats a thickness of paper should be allowed for play. This, of course, cannot be done in each narrow column as used in tabular matter. The object in run-on matter is to make the line just enough longer than the leads so that when thoroughly locked up the leads and the matter shall be of exactly the same length. Half measure and third measure on newspapers are gauged with brass blocks of exactly the right size. The slide or knee of the stick is pressed up close against the block.

Measurement.—A determination, by certain rules, of the amount of type set by a compositor. As generally practiced in America it consists in multiplying the length of the lines in ems by the number of lines. In England the determination is made by ens. It does not appear that the early printers worked by the piece, nor was there any piece scale anywhere known to the trade before about 1750. Men were paid on account of their supposed capacity. Shortly after this, about 1763, James Smellie, an Edinburgh printer, afterwards eminent as a scientific man, devised a scale by which the amount of labor done could be more exactly ascertained. The price paid in Edinburgh at that time was two pence halfpenny a thousand ens. Piece-work became common in London, but the value seems to have been decided by accident, and in 1785 the workmen came together, called upon the master printers and urged a change in the scale. Before this they had been receiving on brevier four pence, but after this the charge was four pence and a halfpenny. The folios, blank lines below the folios, and the foot-lines were not then included. Prices were raised at intervals of a few years, little by little, and clauses were added to increase the price upon some special work, until the scale was somewhat near what it is now. In New York a scale has existed since 1800, when compositors received twenty-five cents per thousand ems. Nearly all of the work, however, was done by the week at seven dollars a week. As newspapers became numerous and strong a piece scale was introduced upon them, which had not before been done. Its introduction on newspapers in New York was about 1836. At present all work possible is executed by the piece, as there is less danger of loss on estimates, and as men need not be looked after so carefully in order to get out a maximum of work. In theory, all measurements in this country are a determination of the number of ems set, and in England of the number of ens. Practically, however, from the complexity of the scale, the custom of including certain parts of a form which are not really set, and from the fact that there must necessarily be greater allowances on some matter than on others, it is not easy always to state what should be paid to a piece compositor, and compositors and employers have both tried to find some way to ascertain with certainty the proper amount. All are agreed that on intricate work the compositor should get more than on ordinary work for the same number of ems, and that a compositor of undoubted skill ought to be able, by a truly adjusted scale, to make the same amount each day; but in effecting this difficulties are encountered. The handwriting of a person like Lord Byron or the manuscript of a writer in a foreign language is composed very slowly and painfully. From three to four thousand ems a day would be a good day's work on such copy. All manuscript involves extra care. There are also differences to be made where an excessive amount of Italic is used, where points and figures are numerous, where words in foreign languages are interspersed, and in fact in every case where work is retarded. Different rates are paid in most places on leaded and reprint matter, and there is a variety of usage in regard to the compensation where there are cuts or where previously composed matter is to be altered. In every case where these differences make a sensible retardation of the speed of the workman he should receive extra compensation, and in most scales this is done as far as is practicable. The person who measures is responsible for making this allowance, and it should neither be more nor less than the custom of the trade in the locality. If it is more it injures the establishment where he is employed; if it is less the workman is at a disadvantage. There is one respect, however, in which employers and employed alike are injured, and of which no scale takes cognizance. It is in regard to the thickness of type.

mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm

In tying up a page use fine twine, winding it four or five times round it, and fastening at the right-hand corner by thrusting a noose of it between the several turnings and the matter with the rule, and drawing it perfectly tight, taking care always to keep the end of the cord on the face of the page. While tying it, keep the forefinger of the left hand tight on the corner, to prevent the page from being drawn aside. The twine being fastened, the compositor removes the page from the ledges of the galley, to see if the turns of cord lie about the middle of the shank of the letter; if they lie too high—as most commonly they do—he thrusts them lower; and if the page be not too broad, he places the fore and middle finger of his right hand on the off side of the head of the page, and his thumb on the near; then, bending his other fingers under, he presses them firmly against the head of the page; he next places the fingers of

NARROW BREVIER.

mmmmmmmmmmmmmmmmmmmmmmmmmmmm

In tying up a page use fine twine, winding it four or five times round it, and fastening at the right-hand corner by thrusting a noose of it between the several turnings and the matter with the rule, and drawing it perfectly tight, taking care always to keep the end of the cord on the face of the page. While tying it, keep the forefinger of the left hand tight on the corner, to prevent the page from being drawn aside. The twine being fastened, the compositor removes the page from the ledges of the galley, to see if the turns of cord lie about the middle of the shank of the letter; if they lie too high—as most commonly they do—he thrusts them lower; and if the page be not too broad, he places the fore and middle finger of his right hand on the off side of the head of

WIDE BREVIER.

The present scales take no note of any of the dimensions of type, except when measured up and down the column or page. An arbitrary rule is made by many scales in declaring that if the type is unduly thin it shall be measured as the next type smaller, but none has any provision by which a thin type, coming within the recognized rule, shall be paid for at a greater rate than a thick type, or by which the compensation for the latter is lessened. The provision by which minion, for instance, is measured as nonpareil is manifestly unjust. The average minion is 26 or 27 per cent. larger than the average nonpareil, and a very slight reduction in the set (or thickness) of the former would practically give the compositor employed upon it, at forty cents a thousand, pay at the rate of fifty-one or fifty-two cents a thousand. The normal face of good type in pica, small pica and long primer is about twelve or twelve and a half ems; in bourgeois, brevier and minion it is about thirteen or thirteen and a half ems, and in nonpareil thirteen and a half or fourteen ems. Anything beyond this is a deformity or a special type, made for some particular purpose. The scale, however, of the New York union calls for thirteen ems on pica to bourgeois, fourteen ems on brevier and minion, fifteen on nonpareil and sixteen on agate. If pica measures twelve ems and three-quarters it becomes counted as small pica, and if minion is fourteen and seven-eighths it is reckoned as nonpareil. No allowance, however, is made where the pica measures thirteen ems and a half or minion sixteen ems. The result of this is that the workmen are continually demanding a greater thickness of type. Some is now made which measures seventeen ems and a half to the alphabet. An equitable method would be to lessen the price on wide type and increase it on thin type. With this end in view W. B. MacKellar of Philadelphia has proposed that the old standard of measurement by ems shall be abandoned, and that a new standard shall be adopted of m's, or the number of the letter m which can be contained in a line. This is the thickest of the lower-case characters, and bears a certain proportion to all other characters, and as a further guaranty he proposes that the alphabet of twenty-six letters shall be of the same thickness as fifteen m's. In the example given of two breviers, one is much thicker than the other. Five lines of the one equal in respect to the number of words set six lines of the other. One line contains twenty-one m's and the other twenty-five, although both are brevier and each alike measures for payment twenty-one ems. The advantages which he claims are that the new method will secure the compositor a just and equal compensation for setting any variety of lean or fat type; it leaves the selection of faces to the printer or publisher, and it does not interfere with the faces as at present made by type-founders. Type of extra condensation is required by publishers on such books as dictionaries and encyclopædias, and this plan would enable them to use the style which their experience dictates. The system seems to be good and deserves trial.

In measuring on a newspaper the most common plan is for the compositor to paste together all of his slips of proof, called commonly "dupes," a contraction of duplicates. Each size is pasted by itself, the agate with agate, the nonpareil with nonpareil, and so on. When the proofs are taken on the proof-press a second proof is also pulled on a different colored paper, and upon this a wheel with an arabesque, a geometrical or a lettered device, which has been inked, is rolled. Practically this is a black band, the design only showing well enough for identification. It is from the width of a quarter of an inch to three-quarters of an inch, and passes over the face of the reading matter, but at one end. Without this mark upon the galley no matter is paid for. The prover keeps this wheel under his control, and when he leaves the office he locks it up. On a morning paper these proofs are taken the next morning and are cut apart, each compositor having his slips in a pile by themselves. They are first distributed into four or five heaps, and then each of these again into a number. The work of each man is placed in an envelope and laid upon his case. In this separation the cutter only knows the stand. Every one is numbered, and every take has at its head a slug by which that number is expressed. The office does not know the individual who set the type. The regular and two substitutes may be on the frame during the week. Each takes his proofs from the envelopes and keeps them himself. It is a bad policy to have the substitute depending upon a regular for his pay. The slips, after having been divided as to type, are pasted so that they are continuous, and once a week they are measured. It is rare that this is done every day, although in some offices more or less is thus done for the convenience of the workman. The measuring is generally performed with a string having a knot at one end. The cord is as long as any compositor is likely to require for his slips, and while passing over the proofs an allowance is made for price-and-a-half and double-price matter. Then the string is placed against a table giving the number of lines and their contents, or simply the number of lines, the contents being afterwards reckoned up. All sizes are added together, with allowances for alteration from copy and time-work, and the amount is carried out. On small newspapers and formerly on all newspapers the compositor ascertained how much he had set by marking the newspaper with some peculiar device, but this is now generally done away with. See DUPLICATE.

In bookwork the compositor has his name written on the first page of his copy, just where he begins. After the first proofs are returned to the proof-reader and he has compared them with the revises, he writes his initials on the matter at its beginning and at the beginning of each galley. The proofs are afterwards cut apart and given to the respective compositors. Those which are of the same width and size of type are pasted together. They are then measured by the foreman, who must compute by multiplication the quantity of matter contained in the proofs. Formerly they were computed by pages, and a resort to special calculation was rarely necessary. When the compositor makes up he measures every page in the form which contains a line of matter as a full page, but does not now estimate pages wholly blank. Cuts are also measured in this case, but full pages are not charged when made up by the office.

The master printer charges for every page in which there is a word of composition or a cut as a full page according to the size of type in which it is. The foot-line, although it does not show, is included with the other. Where small type has been introduced here and there it is to be computed according to its body. Full blanks occurring in the book are to be charged for as text, but not those pages coming after the ending of a book, as for instance where a work ends on the eleventh page of a sixteen-page form. Jobs when measured are calculated according to the type most used, but if there are two differing much then the smaller is taken. Newspapers count from the top of page to the bottom, and from one side completely across. This includes the head, column rules and head rules. If they are over or in pages with fresh matter the rules are charged at that rate; if they are in standing matter they are charged for the same as that. No extra-price matter is placed in the bill to a customer at only the advance which the compositor receives; it certainly is worth once and three-quarters, and generally should take a double price. See for this whole subject SCALE OF PRICES and COST OF PRODUCTION.

Mécanique (Fr.).—The machine, the press.

Medhurst Press.—An iron hand-press which was in use in England seventy years ago. Instead of a screw, rods which were slightly inclined when the press was at rest were made by a circular motion to assume an upright position, thus forcing the platen to descend.

Media Linea (Sp.).—En quadrat.

Mediæval.—In England a modernized old style. This term is used in America to denote a very black type of peculiar shape.

Median-Folio (Ger.).—Demy folio.

Medianiles (Sp.).—Side pieces of furniture in imposing.

Medical Contractions.—Abbreviated words used in medical works. These must be sought in medical books. It is advisable for any printing-office which has a work on medicine to print to purchase a dictionary of the words used in that calling. The special terms are very numerous.

Medical Signs.—Signs and characters appertaining to medicine.

Medida (Sp.).—Measure; width of matter or length of page. Medida tipográfica, type-measure. See TIPÓMETRO.

Medio Punto (Sp.).—Circle (of brass rule).

Medium.—A size of printing-paper, 19 by 24 inches; writing, 18 by 23 inches. This when doubled is the principal size in which book-paper is made in America, and is found in more weights and qualities than any other.

Melbourne.—A city in Victoria, Australia, which has grown with great rapidity since its foundation in 1835. It is a very active and enterprising town and the seat of much business. The newspapers published there will compare with the greatest in Chicago or New York, and have palatial buildings. The government printing-office employs three hundred and forty persons, and there are besides several other large offices and many small ones.

Melting-Kettle.—A utensil employed for melting down composition for making rollers. See ROLLERS.

Membrete (Sp.).—Side-heading on note-heads, letter-heads, circulars, &c.

Menamin, Robert S., was born in Newtown-Stewart, County of Tyrone, Ireland, on December 2, 1833, and died in Philadelphia on April 19, 1887. Mr. Menamin began to learn the printer's trade in Philadelphia with T. K. & P. G. Collins, but after finishing a part of his apprenticeship there took up his residence in New York, where he was for a considerable time with D. Appleton & Co. During this period he was very active in the Typographical Society, and was repeatedly elected one of its officers. In 1864 he obtained employment upon the Printer, which had connected with it a printer's warehouse, and next year Mr. Menamin determined to go to Philadelphia and begin a similar warehouse there. He did so, also publishing the Printers' Circular, which was for many years the only printing journal issued in America, other than the circulars sent out by type-founders. In this periodical he reprinted Southward's Dictionary of Printing, advance sheets having been sent him from the other side, but with considerable additions. The next year, under the editorship of J. Luther Ringwalt and Jessie Ringwalt, it was published as an Encyclopædia of Printing. Up to the appearance of this present work it was the largest and fullest book upon printing in the English language, containing a vast amount of information not elsewhere to be found, and reflecting much credit upon the editors and Mr. Menamin. Some years after he had removed to Philadelphia he purchased the machine-shop and press-building manufactory of Frederick Bronstrup, who in turn was the successor of Adam Ramage, and later was interested in the Feister Company. He was a delegate to the International Typographical Union from New York, and always retained his interest in that organization, as well as in the Philadelphia and New York Typographical Societies. For fifteen years he was secretary of the Pennsylvania Editorial Association, and in 1884 was its president.

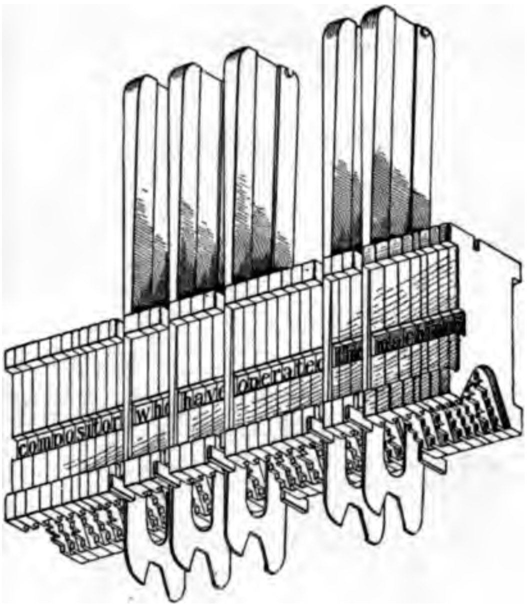
Mentel, John, the first printer in Strasbourg, has often been declared to be the inventor of printing. He died in the year 1478.

Mentz.—A city of Hesse-Darmstadt, in Germany, famous as the place where books were first printed. It is on the Rhine, nearly at its junction with the Main, and it is within a few miles of Wiesbaden. Its population is now about forty thousand. Before Gutenberg's time it had been a very important city. In the Gutenberg-Platz is Thorwaldsen's statue of Gutenberg. The name of this city is frequently printed Mayence, which is the French form. It now has twenty printing-offices, fourteen of which use steam or gas power. Five daily and two weekly papers are published there.

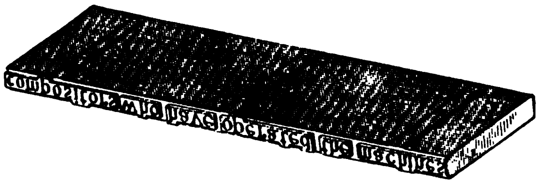
Mercury.—A favorite title for newspapers from the earliest date, derived from Mercury, the messenger of the gods. Two centuries ago the term Mercury was applied to one who sold or delivered newspapers, pamphlets or news-letters.

Meredith, Hugh, was a partner of Franklin for some time. He was born in Pennsylvania, and was bred a farmer, but went to Philadelphia when he was thirty years of age to learn printing. He was an honest and sensible man, but addicted to drinking. Franklin was for some time acquainted with him before they went into partnership, for which Meredith's father furnished the money. Finding him of little value, Franklin in 1729 gave him thirty pounds and a saddle for his share, and Meredith went with a number of his friends, who were farmers, to North Carolina, where he settled.

Mergenthaler Machine.—A machine for assembling matrices and casting a line of type at once, no separate types being required and the machine operating by means of a key-board at a rate considerably faster than hand-composition. Instead of setting type, as most composing-machines do, the movement of a key causes a matrix to drop. Succeeding movements of the key-board bring down other matrices, and when assembled and justified melted metal is ejected against their faces, forming when cool a slug just one line long, which is then trimmed, and the matter is ready for use. The machine is about four feet high, and is strongly and compactly built. The operator sits at a key-board, each key answering to a letter. A touch on one of the keys causes a matrix to fall down an inclined plane from the top of the machine to the centre, where, others succeeding it, they are brought together. These matrices are of brass, just the width of a type, but three-fourths of an inch from top to bottom and an inch and a half in length. Such a size gives them momentum in the fall and prevents their stoppage by friction or dirt. Upon the edges of these are devices, somewhat like the wards of a key, each letter having a different indication. This serves to distinguish the matrices when distributing. When enough letters have been brought together to make a line the spaces, which consist of two metal wedges with their points together, are forced forward, the requisite width thus being given, as when the line is justified the wedges will move no farther. The line is then moved farther on until it meets a slot the length of the line, through which melted type metal is ejected against the matrices. Behind the slot there is a pot filled with this fluid substance heated by gas. Within the pot there is a mechanical plunger, which, when the signal is given, forces forward the metal against the face of the matrices, where it solidifies, making a complete line. A horizontal blade advances from the rear and pushes the slug forward out of the mold and between trimming-knives, which leave it of exactly the right height and thickness. From this it is advanced into the galley. As soon as the type has been cast the matrices are lifted to the top of

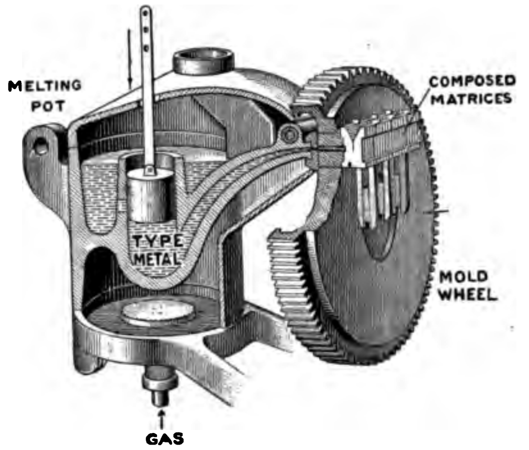


MATRICES IN ORDER FOR CASTING.


TYPE SLUG READY FOR USE.

the machine, thence being moved horizontally until they reach a place where the teeth are disengaged. When these are found each matrix in turn drops into its own short channel, which leads to the magazine. As each matrix has a different arrangement of teeth, of two different sizes, the larger being differently placed, they hang on to a suspensory bar, having corresponding hollows and projections, until a place comes where they do not hold. Distribution is effected in a number of places at once by this method. Each of the matrices is only the width of the character and its shoulder, and the part to imitate in the cast is in the centre. Justification is effected for one line while the operator is setting the first few letters of the next line, and distribution of the matrices is continually going forward. There is no distribution of type or type bars. When used the lines are thrown into the melting-kettle, and that ends them.

The advantages claimed for the machine are that there is no justification and no distribution, saving in the one case one-fifth and the other one-fourth of the work, and that composition is executed by it at a rate four times faster than by hand. It would seem, by statements submitted, that some phenomenal workmen have set 250,000 ems in a week, that many good hands have equaled 200,000 ems in the same time, and that any workman can after sufficient practice set 150,000 ems in six days. This would be respectively four thousand, thirty-three hundred and twenty-five hundred an hour, but really more, as in most cases only nine or eight hours are worked. The fine lines of letters are frequently not continuous; occasionally a letter is unduly heavy or unduly light, and often, particularly on the older machines, the letters are high in line or low in line. The last defect comes from an imperfect or worn matrix; the high letters are caused by a hot matrix which has been used several times immediately before, and the first comes from a chilled mold, into which the metal does not flow freely. Other defects alleged are inequality and inexactness of the bars, and the dazzling appearance of the cast, making it injurious to the eyes of the make-up. All of these defects were very marked four or five years ago, but have now been obviated to a great extent, if not wholly, in some portions. It has been difficult to keep the melting-pot at an even temperature; the supply of original faces in the possession of the company was limited, and the machine frequently broke down in its earlier years. It has scarcely been tried by the book men on account of these various defects, which appear magnified when an impression is taken on hard paper; but it has been much used in newspaper composition. A couple of hundred machines are now employed in the United States.



METHOD OF CASTING.

Meridian.—A size of type little used, which corresponds to four lines of small pica.

Meridional Type.—Letters cast for a southern language, such as one spoken in Africa.

Mesa de Tinta (Sp.).—Inking table or cylinder. Distributing-table, sometimes called mesa de distribucion de tinta.

Mesa Receptora (Sp.).—Receiving-table.

Metal.—The compound used for type, stereotype plates or the backing of electrotype plates. It consists of lead, antimony and tin in various proportions, sometimes mixed with copper or bismuth.

Metal Furniture.—Furniture cast with a metal somewhat like type metal. See FURNITURE.

Metal Galley.—Galleys generally made of zinc in England, but of brass in the United States, and chiefly used for newspaper work. Most galleys used in America are of metal with a little wood, but the true meaning of the English phrase is an all-metal galley.

Metal Rule.—A general term for em rules or dashes. Also applied to longer rules, such as two, three and four ems.—*Jacobi*. This term is not thus used in America. A metal rule would be a brass rule, used to separate matter in a newspaper or job. The other rules are here called em dashes and two, three and four em dashes.

Metallic Cards.—Cards made with a prepared enameled surface.—*Jacobi*.

Metallic Quoins.—Patented iron quoins in lieu of the old wooden ones. The expression is thus used in England, but in America they are known as metal quoins.

Methodist Book Concern.—The Methodist Episcopal Church in the United States owns and carries on two of the largest printing-offices in America, together with a large number of smaller offices and bookstores. Collectively these are known as the Methodist Book Concern, and are managed by a committee known as the book committee. When the church was first planted on this side of the water the Rev. Asbury Dickins made his journeys from one place to another with his saddle-bags filled with books, which he sold for the benefit of the ministers. The Conference soon saw that the church would be advantaged by causing each minister to be a salesman for the society, and in 1789 it placed the matter under the control of a committee at Philadelphia. The agent then chosen published books and sold them at a profit, but after the beginning of the century the business was transferred to New York. In 1825 a printing-office was begun with four iron hand-presses, which multiplied in ten years to thirty. In 1836 the building was destroyed by fire, inflicting a heavy loss; but in three or four years the business had recovered. Shortly after the New York printing-office was begun another was started in Cincinnati, which was also successful. When the Methodist Church divided in 1845 all of the property in the South and much of the funds went to the Methodist Episcopal Church, South, thus inflicting another heavy loss upon the Concern. In 1868 a new building was erected in New York at the corner of Eleventh street and Broadway, and the offices, together with many for the church at large, were removed thither. The old building was kept as the manufactory. In 1888 both were abandoned, and a new and elegant building was erected at the corner of Fifth avenue and Twentieth street. A very handsome edifice was erected for the Western Book Concern in Cincinnati about twenty years ago. In addition to these extensive establishments there are minor ones at Chicago and many other places, all under the control of the Book Committee. Many newspapers are published in these depositories and by the parent concerns.

Metido (Sp.).—Inserted. Said of sheets of pamphlets, &c., when placed one within another to facilitate binding. Also new matter inserted in proof-sheets.

Metre.—The measured arrangement of words in verse. Used in hymn-books to distinguish the varied measures, as long, short and common metre.

Metteur-en-Pages (Fr.).—The make-up; a stone-hand. Literally, one who puts into pages.

Mettre (Fr.).—To put; mettre la forme sous presse, to put the form to press.

Mettre en Ordre (Fr.).—To put in order.

Mexico.—The country lying next south of the United States of America, and embracing several States consolidated as a republic under the title of the United States of Mexico. Its capital city bears this name.

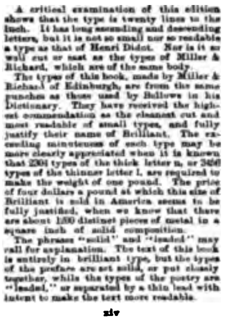
Mexico was the first city on the American continent to own a printing press and to publish a book. The press arrived in 1585, and the first book, A Spiritual Ladder for Reaching Heaven (Escala Espiritual para Llegar al Cielo), was issued in the following year. Twelve other books were printed before 1550, and eighty-five in all bear dates of the sixteenth century. The greater part of these were ecclesiastical works. After Spanish, the language most frequently employed was Latin, then came Aztec and other native tongues. Printing, though introduced so early, was hampered by too many restrictions to flourish, and only the principal towns, like Vera Cruz, Puebla and Guadalajara, could exhibit printing-presses. There were six at Mexico in 1761, but at the beginning of this century only three remained. The first issue of a regular periodical, the Mercurio Volante, was begun at Mexico in 1693, and in 1722 appeared the Gaceta, a monthly publication more in accordance with our conception of a newspaper. It was not until the war of independence gave greater freedom to the press that a strong impulse was communicated to journalism as well as to all kinds of literature.—*Mayo W. Hazeltine.*

There are in the Republic of Mexico at present many journals and some respectable job-printing houses. Seventy-two newspapers are published in the capital and one hundred and fifty-seven in the provinces, Jalisco, Tamaulipas, Vera Cruz and Guanajuato following in the order given. The greatest circulation of any one of them is only a few thousands. The Sunday issues are the largest. The Government printing-office has five cylinder presses. It is the most important printing establishment in the country. Type is chiefly imported, as are presses. There are twelve paper mills in the country. There is a very high tariff on all imported articles, and all doubtful points are construed against the foreigner. Labor is very cheap there, although the necessaries of life cost about as much as in the United States of America. Printers receive eight dollars a week as a maximum, the natives in the small towns not getting half that price.

Mezzotint.—A method of engraving in which the plate is covered with little punctures so close together that a proof will make an entirely black impression. Part of this surface is burnished away and smoothed down until a picture is evolved from it, showing the gradations of light and shade admirably. It can be done easily and rapidly. The tools required are the grounding-tool, the scraper and the burnisher. The plate should be prepared as if intended for the graver, and laid flat upon a table with a piece of flannel spread under it to prevent it from slipping; the grounding-tool is then held perpendicularly on it and rocked with moderate pressure backward and forward until the teeth of the tool have equally and regularly marked the plate from side to side; the operation is then performed from end to end, and from each corner to the opposite, but it is necessary to observe that the tool must never be permitted to cut twice in the same place. By this means the surface is converted into a rough chaos of intersections which, if covered with ink and printed, would present a perfectly black impression upon the paper. This is the most tedious part of the process. The remainder, to a skillful artist, is much easier than line-engraving or stippling. It consists in pressing down or rubbing out the roughness of the plate by means of the burnisher and scraper to the extent of the intended figure, obliterating the ground for lights, and leaving it for shades. Where a strong light is required the whole ground is erased. For a medium light it is moderately burnished or partially erased. For the deepest shades the ground is left entire. Care is taken to preserve the insensible gradations of light and shade upon which the effect and harmony of the piece essentially depend. Engraving in mezzotinto, it is thought, approaches more nearly to the effect of oil-paintings than any other kind of engraving. It is now, however, very rarely practiced. It is well calculated for the representation of obscure pieces, such as night scenes, &c. The principal objections to this method were that the plates wear out speedily under the press, and of course yield a comparatively small number of engravings, but to-day the objections are that they are too indistinct, too fuzzy and too incapable of showing action or minute parts.

Michigan.—This is one of the Northwestern States of America, and was settled by the French in the last century. Printing was introduced in Detroit in 1809. On August 31 of that year the Essaie du Michigan ou Observateur Impartial was issued in French and English by the Rev. Gabriel Richard, a Catholic priest. In 1825 the Michigan Sentinel was published at Monroe by Edward D. Ellis. Shortly after this other journals were begun in other towns. The total number of periodicals in 1840 was 32; in 1850, 58; in 1860, 118; in 1870, 211; in 1880, 464; and in 1890, 644. In 1880 the number of daily papers was 33, and in 1890 43. The chief town is Detroit. There are a number of dailies there, several large job-printing houses and three or four lithographic establishments. After Detroit come Grand Rapids, Lansing, Ann Arbor and Battle Creek.

Microscopic Printing.—The first printing was done with large letters, ranging from great primer to double paragon, but the desire of the publishers to crowd in more matter speedily induced the production of smaller type. Brevier seemed for a long time to be the smallest, and when nonpareil came, its name, which signifies having no equal, testifies the admiration which was felt at anything so small. The Elzevirs published many books in small types, and some other printers of the sixteenth and seventeenth centuries did likewise. The one who made the smallest types of the seventeenth century was Jean Jannon, of Sedan, in France, who in 1625 brought out a diamond. Dutch, English and American founders seem to have attempted nothing smaller than this until within a very recent time. All types below brevier have the names of gems or names importing superior excellence, and it is reasonable to suppose these were given on account of their greater minuteness rather than because they were particularly well cut. Darling (minion), unequaled (nonpareil), a gem (pearl), and a precious stone (diamond) were the names in the order in which they ran at the beginning of this century. Agate was given as a name on this side for half small pica by George Bruce in 1822, and at about the same time the same body was characterized as ruby by Hansard in England. Minion, nonpareil and agate are used in advertisements in newspapers; pearl is required in orders of dancing, and all of these sizes are employed as notes in books; but diamond, except in Bibles and prayer-books and for notes, seems to be almost entirely useless. Unless an office is doing a business of $100,000 a year, chiefly in composition, it is not economical to provide a case of it. The celebrated French type-founder, Henri Didot, in 1825 cast a body of half nonpareil, of about twenty-five lines to the inch, the letters being distinct and well made. This was a great advance, for a page of a certain size would contain twice as many words in type so diminutive as it would in diamond. Other type-founders have approximated this minuteness, but never with so clear and good an appearance. The smallest face made by a British foundry is the brilliant of Miller & Richard, of which about twenty lines go to the inch. The most noteworthy book printed in this was John Bellows's English and French Dictionary. The size of the page of type was two and a half inches wide and four and a quarter inches high. It was divided into two columns and was embellished with a red line around each page. Theodore L. De Vinne has since published a book in the same face of type, entitled Brilliants, the width of the type page being an inch and a third, and its length an inch and two-thirds. In this inch and two-thirds there are thirty-four lines, and the page measures 884 ems. This size, it is believed, has not yet been made by American founders, and it costs four dollars a pound to lay down in American offices. It is not likely that types smaller than this will soon be demanded for use in England or America. For transient purposes a microscopic reduction by photography will answer well enough, and it can be carried to a scale of minuteness which no type can ever equal. A third of minion or brevier can easily be photographed; but in real type there are difficulties both in punch cutting and matrix fitting, and in the compositor's department the minuteness of the letter, the shallowness of the nick and the tendency of the lines to bulge in the centre must always be considered. Minion is perhaps the smallest legible type; people with good eyes can read nonpareil and agate for an hour or two, but no one will voluntarily read pearl for more than a few minutes.



A critical examination of this edition shows that the type is twenty lines to the inch. It has long ascending and descending letters, but it is not so small nor so readable a type as that of Henri Didot. Nor is it so well cut or cast as the types of Miller & Richard, which are of the same body.

The types of this book, made by Miller & Richard of Edinburgh, are from the same punches as those used by Bellows in his Dictionary. They have received the highest commendation as the cleanest cut and most readable of small types, and fully justify their name of Brilliant. The exceeding minuteness of each type may be more clearly appreciated when it is known that 2304 types of the thick letter m, or 3456 types of the thinner letter l, are required to make the weight of one pound. The price of four dollars a pound at which this size of Brilliant is sold in America seems to be fully justified, when we know that there are about 1500 distinct pieces of metal in a square inch of solid composition.

The phrases "solid" and "leaded" may call for explanation. The text of this book is entirely in brilliant type, but the types of the preface are set solid, or put closely together, while the types of the poetry are "leaded," or separated by a thin lead with intent to make the text more readable.

xiv

A PAGE FROM BRILLIANTS.

Middle.—The type in the centre of a brace, thus: ⌃. See BRACE.

Middling Spaces.—Spaces cast four to an em of any particular body. It is not the custom at the present day in America to use this expression. Four-em spaces is the more common term.

Miehle Press.—A new press, lately devised by Robert Miehle, a pressman of Chicago. The bed is carried in harmony with the movement of the cylinder while printing, then it is gradually slowed up, carried smoothly over the centre, and returned for the back movement. There is no jar perceptible anywhere. Great speed is claimed for this press.

Mignona (Ital.).—Minion.

Milanini (Ital.).—The next to the smallest size of type used in Italy. It is two-thirds the size of Italian nonpareil, which is larger than the English nonpareil, and consequently is about the American diamond in magnitude.

Mill-Board.—A thick and very hard kind of paper, used for covering books.

Mill Ream.—A ream of writing-paper as it comes from the mill contains eighteen quires of twenty-four good sheets, and two quires of twenty sheets of outsides, that is, damaged paper; 472 sheets in all, good and bad—this is called a mill ream.—*Southward.*

Milled.—Paper rolled or glazed—with a high surface.

Miller, Henry, a native of Waldeck on the upper Rhine, who served an apprenticeship in Basle, Switzerland. After this he traveled much, coming to America in 1741, but returning the next year. In 1751 he came again, but in 1760 he took up his permanent residence in Philadelphia. He was a good scholar and an excellent printer. In 1779 he issued a farewell address to his readers, saying that it was nearly fifty years since he first published a newspaper in Switzerland. He was then approaching fourscore, but was of opinion that when a man arrived at his sixtieth year he should enter on his Sabbath or day of rest from the cares and troubles of this life. He died in Bethlehem, Pa., on March 31, 1782, aged eighty.

Miller, William, originator of the chief type-foundry in Great Britain, learned his trade in the Glasgow Type-Foundry. About 1809 he started a foundry at Edinburgh under the firm-name of William Miller & Co. It has steadily grown ever since, the firm taking its present title of Miller & Richard in 1838. It has been especially noted for its old-style faces and for its good Romans. An agency has existed in San Francisco for some time, and another in Montreal, Quebec.

Milwaukee.—The chief city of Wisconsin, lying upon Lake Michigan. Printing was begun here on July 14, 1836, by Daniel H. Richards, who printed the Milwaukee Advertiser. The Sentinel was started in the following June. There are now published in this city 10 daily papers and 42 other periodicals, 23 of these newspapers being in German, 3 in Polish and 2 in Bohemian. This makes 28 foreign newspapers out of a total of 52, Milwaukee being probably the only city in the United States having a population of over a hundred thousand where the newspapers in foreign tongues outnumber those in English. This city is the centre of a large book and job printing interest and has one type-foundry.

Minders.—A short term very generally used for machine-minders in England, who are called pressmen in America. That term in England is generally restricted to hand pressmen.

Minerva Machine.—A small platen jobbing-machine—the original "Cropper" machine.—*Jacobi.* This is a piracy of the well-known Gordon machine, first and still manufactured in America. Minerva is used all over Europe as a generic name for a small jobbing machine.

Minion.—A type one size larger than nonpareil and one size smaller than brevier. It is called seven-point on the point system, and in that measures about ten lines to the inch. Upon the old bodies it differed in magnitude more than any other known. Four American foundries and a British foundry make minion 119, 122, 124½, 127 and 128 ems to the foot, the smaller gaining on of the larger one line in eleven. The gap between the sizes brevier and minion is very small, the largest minion being only smaller than the smallest brevier one line in thirty-six, while the largest minion is greater than the smallest nonpareil one line in six. On this a stick which would contain a thousand of minion would hold one thousand four hundred and fifty-two of nonpareil. The disproportion between nonpareil and minion is greater than exists between any other two sizes of type, and in most makes there is not much difference between brevier and minion. The great disparity between nonpareil and minion has occasioned the introduction of a size between them, which is largely used in English newspapers and is sometimes employed in America for borders. Minion has its chief employment in the United States on newspapers and on books of reference which must be condensed. It is the smallest type which can be read for a long time without injury to the eyes. It is half English or two-thirds small pica in magnitude, and is double the depth of some microscopic type cast in France. Very few fancy faces are cast upon it, nonpareil and brevier supplying almost all needs. Few book offices contain much minion, and most small offices are without it. In French it is known as mignonne, in German Colonel, mignona in Italian, miñona in Spanish, and colonel in Dutch. Minion was used in England before 1730.

This line is set in Minion.

Minionette.—A kind of type between nonpareil and minion, further separated as to size by the founders than

r kind of type. It has not been introduced into
; system, nor is it half of any other size. Min-
orders and quadrats have sometimes been cast
ca. It is called emerald in England, and is used
ndon daily papers for the Parliamentary report.

eapolis.—A city in Minnesota, noted for its
wth and its enterprise. It has five daily papers
-nine other periodicals. Much job printing is
e.

esota.—This State was an unbroken wilderness
rs ago. It lies on the north line of the United
est of Lake Superior. In 1849 newspapers were
d at St. Paul, the Minnesota Register being
April 27 by McLean & Owens. It was printed
nati. The next day the Minnesota Pioneer was
l in St. Paul by James M. Goodhue. It was the
er printed there, and became a daily in 1854.
olis also soon began publishing, and was quick-
ed by other towns. The total number of news-
sued in the State in 1860 was 49: in 1870, 95;
28, and in 1890, 427. There were published in
nd in 1890 24 daily papers. Those issued in St.
l Minneapolis will bear favorable comparison
published elsewhere in the Union. In these
s there is much job printing, and considerable
lso done in Duluth.

ikin.—A size of type smaller than brilliant,
urth of pica in body only. This definition is
obi. Both the name and the size are unknown
ca, and type as small as this is not cast in either
d States or England. Should this ever be done,
be possible with the Benton & Waldo machine,
be the extreme range of type for minuteness.
oints are sometimes cast on half nonpareil.

na (Sp.).—Minion, seven-point.

scole (Ital.).—The lower-case letters.

scula (Sp.).—Small letter, lower-case letter.

e Mark.—An accent mark (′) is used to ex-
onological or geographical minutes. The same
ubled is used to indicate seconds. In cases of
this mark has been used as indicating an acute
it for this purpose it is always offensive to the
is much used in grammars and spelling-books
he syllables on which a stress falls.

es of Evidence.—A class of legal work in

(Sp.).—Paragon, twenty-point.

llany.—That class of copy upon newspapers
nsists of anecdotes, short stories, statements of
atural science or any other matter not particu-
ting to the news of the day.

en Pages (Fr.).—Imposing.

int.—An error in printing caused either by ac-
uring the progress of presswork, by incorrect
ion, or by mistakes in making up forms. See
PHICAL ERRORS.

—An omission to lay on a sheet by the feeder of
e.

l.—The book containing the prayers and cere-
f the mass. It was at one time very elegant,
great reputation being employed to ornament
he best calligraphers executing the words.
nissals were issued both at Milan and Rome in
e German Government lately gave £10,000 for
which was once presented by Pope Leo X. to
ry VIII. of England, along with a parchment
g on that sovereign the right of assuming the
efender of the Faith, borne ever since by Eng-
s. Charles II. made a present of the missal to
tor of the Duke of Hamilton, whose collection
by auction some years ago.

Missing Sheets.—Any omitted sheets from a gathered book.

Mississippi.—One of the United States of America, lying upon the Mississippi River. It is almost entirely agricultural, and no large towns have sprung up on its territory. Little is known of the early history of the press there. In 1810 four newspapers were published in Natchez. Ten were printed in the whole State in 1828, and 25 in 1840. There were 50 newspapers in 1850, 73 in 1860, 111 in 1870, and 128 in 1880. In 1890 there were 7 daily, 134 weekly and 14 other periodicals. The chief towns are Natchez, Jackson and Meridian.

Missouri.—A large State on the west shore of the Mississippi River, in which settlements were begun in the last century. The first newspaper was issued in St. Louis in 1808 by Joseph Charless. It was then entitled the Missouri Gazette, but is now called the Missouri Republic. The first sheet was eight by thirteen inches in size. Other newspapers were soon established there, and their number has steadily kept increasing until the present time. The total number of newspapers published in Missouri in 1840 was 35; in 1850, 61; in 1860, 173; in 1870, 279; in 1880, 530, and in 1890, 756. There were in 1880 43 daily and 487 other periodicals; in 1890 there were 76 daily and 680 other periodicals. St. Louis is the largest city, and does the most important newspaper and job printing business. In the former it may bear comparison with any city in the world. Much printing, lithographing and bookbinding are also done. There are two type-foundries. In Kansas City there is also much work executed. Next to these come St. Joseph and Springfield. This State ranks as fifth in population of the United States of America and as seventh as to the number of newspapers issued.

Mitering-Machine.—A mechanical appliance for chamfering or beveling rules for borders, &c.

Mitre.—To chamfer or bevel the ends of rules in order that they may join closely in forming a border. To do this well requires great skill, as if too much is cut off the rules will not join, and if not enough is cut they will bind and the matter inside will not lift. Inexperienced persons will do well to cut their rules a little long and then file them down, if they are not provided with a machine. See RULES.

Mitred.—Joined at an angle. In bookbinding when the lines in finishing meet each other at right angles without overrunning each other they are said to be mitred.

Mitred Corners.—Rules made with corners beveled or chamfered.

Mittlesteg (Ger.).—The long cross.

Mixture.—An extra charge involved on composition if three or more types are used in a work.—*Jacobi.*

Mocarro (Sp.).—A feast given by apprentices to the other workmen on becoming journeymen.

Mochuelo (Sp.).—Out. Jocosely, the discharge of a workman.

Model Press.—A jobbing platen machine, originally of American make, but which is now manufactured in Great Britain.

Modern Faces.—These are those kinds of Romans which have been cut since the beginning of the century and which differ from the styles preceding by being more regular and even and having less angular serifs.

Modern Sclavonic.—This language, otherwise Russian, is said to have first appeared in books in portions of the Old Testament printed at Prague between the years 1517 and 1519.

Mojador (Sp.).—Place where the paper is wet down the workman who wets the paper.

Mojar (Sp.).—To wet (type, paper, &c.).

Molde (Sp.).—Mold; form of type. Molde de rodillos, roller mold.

Molinete (Sp.).—Blow caused by the frisket falling on the tympan, and this on the form.

Molly.—In throwing with quadrats if the nicks are not uppermost; this reckons as a blank.—*Jacobi.*

Mönch (Ger.).—A mark, a dark spot occasioned by imperfect distribution.

Mönchbogen (Ger.).—Spoiled sheets in book-printing, which through carelessness in feeding or the press being out of order are only partially printed.

Mönchslag (Ger.).—An impression that is filled with marks.

Monk.—Any black patch on a printed sheet caused through insufficient distribution or bad ink. A friar is the corresponding term for a light spot. These light and dark spots were formerly more common than at present, and the characterization of them as monks and friars has now gone out of date.

Monkeys.—Compositors were sometimes thus styled by pressmen in retaliation for being called by them pigs. —*Jacobi.*

Mono (Sp.).—Name given to any small job or table of easy composition.

Monogram.—A letter or letters, with or without other devices, employed to indicate a certain person or firm. The letters are often interlaced in such a way that a part of one also forms a part of another. Sometimes used by an artist or printer to mark and identify his work.

Monotint.—Tint-printing in any one color.

Montana.—One of the United States of America, situated in the Rocky Mountains. A newspaper was begun as early as 1866 at Helena, and in 1880 there were fifteen newspapers. In 1892 there were 13 daily and 72 other journals. Helena and Butte City are the chief towns of the State.

Monter une Presse (Fr.).—To put up a press.

Montar (Sp.).—To mount or set up a press or other machine; to set up cases on the frame ready for work; to make up a page or table of various measures.

Monthly Statement.—The bill rendered the first of each month for the work done during the previous month. Flat letter, 10 by 16 inches, and flat cap, 14 by 17 inches, are the most serviceable shapes of paper for this class of work, but in some localities 17 by 22 is used.

Moore, John W., a printer and publisher, died in Manchester, N. H., on March 23, 1889, aged eighty-two years. He was a native of Andover, Mass., and completed his apprenticeship to the printing business at Concord, N. H. He published several newspapers and wrote a large work on music and another of recollections of the newspaper press of New Hampshire.

Mordant (Fr.).—The copy-holder, the bodkin used to secure copy.

Mordante (Sp.).—Copy-holder; a strip of wood, divided in the middle and fixed in the case, for holding the copy.

Morder (Sp.).—To bite. Said of the frisket when it covers any part of the form on account of not being sufficiently cut away.

Mordre (Fr.).—To bite.

Mores, the Rev. Edward Rowe, a writer on typography, was born at Tunstall, in Kent, England, about the year 1729. He was educated for the church, but did not, however, officiate, devoting himself to literary and historical pursuits. In 1772 or before he came into possession of John James's foundry, which had been rendered great by the accumulation of material from other makers, no less than nine foundries being consolidated in it. Some of his punches and matrices were two hundred years old. Mr. Mores set himself at work to classify and arrange the materials he had, and much of what he learned about his foundry and preceding and contemporary foundries will be found in his Dissertation upon English Typographical Founders and Founderies. It is regarded as of great value to the typographical antiquary, as it contains much which must otherwise have been lost. It has also much value to the bibliographer, as only eighty copies were printed, and it is now difficult to get one. He did not live to see the publication of his work, but died in 1778.

Morning Newspaper.—A daily newspaper published in the morning. Newspapers issued in the morning usually have a larger circulation, publish more matter and are distributed through a wider range of territory than an evening paper. They owe this largely to the fact that a morning newspaper is prepared at the end of the day, when everything that is to occur during the twenty-four hours has happened, with the exception of crimes and accidents, and even these are not known until the next day; but when evening newspapers go to press the history of a day is by no means finished. Much is going on which the editor is very desirous of publishing, but which he is obliged to leave, because his paper cannot be delayed. The hours for the editors and reporters of an evening paper are from about eight in the morning until about half-past two in the afternoon; and in New York and some of the other large cities they make no attempt to give a history of anything which has been reported in the morning papers. Their day is only a half day. The morning newspaper, on the contrary, gives full accounts of all that has happened since its last issue, as well as everything previously unrelated. The printing-offices of a morning journal are greater in the composing department than those of an evening paper. Occasions have been known where one hundred and fifty men have set type for twelve hours to get out a single issue. See Daily Newspaper.

The routine on morning newspapers in England is different from that followed in America. The foreman is known as the "printer." He is present at night, and has a deputy and several assistants. On a large daily paper there will be perhaps eighty compositors. Bourgeois leaded and widely spaced is generally used for the leaders, foreign telegrams and other very important matter; minion or minionette for general news, reports and Parliamentary debates; nonpareil or ruby (agate) for sporting, markets, shipping, &c., and ruby for advertisements. When "copy" is called each man in his turn goes to the stone for his take, and does this as he needs it until the supply is exhausted. He then puts his name on a slate, those who are out taking in the order their names are inscribed when copy does come. The copy which is set is thrown indiscriminately into a receptacle, from which it is gathered by a boy and arranged. When a proof is taken he divides it in half, puts the copy which belongs to each half with it, and takes it to the readers. The first matter in the evening is the advertisements. These are made up in a separate room, where all advertisements, either live or dead, are kept. Composition on these notices frequently begins early in the day. The compositor who has the first take of any copy is told the type it is to be set in. The next compositor calls out to him and is told by No. 1 what type to employ. No. 3 inquires of No. 2 in like manner, and so on to the end. When enough has been emptied the foreman calls out that there is a galley to pull, and the compositor whose turn it is stops composition and locks up the galley, delivering it to the proof-puller. He then has nothing more to do with it until the proof comes out. The first compositor's name is written on the proof, as are the others, but he is supposed to correct the whole unless it is unusually dirty. Such an office will require seven readers, one or more first-proof revisers and a press-reviser. If the newspaper is prosperous and there is a reputation for accuracy to be kept up two readings are done, but many get along with only one. In case of necessity proofs are hurriedly read or not read, just as they are in American offices. The copy-holders are men. In some offices readers are permitted to alter anything palpably wrong, and in this case the proof is "rung." On others the readers can only query, and the question goes to the editors. The readers' work begins about half an hour later than the compositors', and ends generally at half-past two. The foreman receives about £5 a week; a swift compositor during a busy week may make £4, and time-hands earn about £4 10s. These figures are from an English authority, but seem excessive.

Morocco.—A very fine grade of leather, used only in the best bookbinding. Turkish morocco is employed for the better class of work, and is susceptible of the highest degree of finish and the richest ornamentation. There are generally three qualities of this leather. Levant morocco differs from Turkish in being heavier, with a larger grain. It is sometimes crushed, and when this is done it becomes more susceptible to fine hand-tooling. It is only used on the finest quality of work, either half, three-quarter or full binding, with gilt edges. On very large books the leather is usually left uncrushed. It is nowadays used almost exclusively in the English bindings of large Bibles.

Morralla (Sp.).—Superfluous sorts left after laying a new font of type; also the lines of Italic, job type, &c., used in a work when removed from the dead matter.

Morris, George Pope, an American poet, was born in Philadelphia on October 10, 1802. He went to New York very early, and entered upon an apprenticeship to the printing business in the office of George F. Hopkins. Soon afterwards he began writing for the newspapers, and after the completion of his time he began, in conjunction with Samuel Woodworth, another printer and poet, the publication of the New York Mirror. The typographical appearance of this periodical was excellent; its illustrations were numerous, and the reading matter was good. Some of the best literary men in the United States wrote for it, including Bryant, Halleck, Paulding, Fay and Willis. After the Mirror, which lasted from 1823 until 1842, was discontinued he conducted other journals, and in 1846 established, in conjunction with Nathaniel P. Willis, the Home Journal, which is still in existence. Morris's reputation was chiefly derived from his songs, which were exceedingly popular. These include Woodman, Spare that Tree; Long Time Ago, and My Mother's Bible. Many of them were set to music. He published one volume of poetry and one of prose, and wrote a successful play. He married early in life the daughter of his employer, George F. Hopkins, and for many years resided at Undercliff, on the Hudson River, nearly opposite West Point. He was a brigadier-general in the New York State Militia, and was therefore commonly known as General Morris. He retained his connection as a member and honorary member with the New York Typographical Society his whole life, and liked to be considered and called a printer. He died in 1864.

Mortaja (Sp.).—The mortise or hollow left in chases of hand-presses for the points.

Mortise.—A mortise is where a few letters or lines of type or a cut are inserted in the body of an engraving or block. Much care must be taken that the edges of the mortising aperture shall be perfectly square and true. Usually speaking, the part mortised in is wedged in its location, there being no other method of holding it firm.

Mortised Type.—Type in which some of the portion which does not print is cut away, so that other letters or brass rules can be inserted.

Morton, John P., a printer, publisher and bookseller of Louisville, Ky., was born at Lexington, in that State, on March 4, 1807. He entered Transylvania University and had passed with honor through the sophomore class when, through the failure of his father in business, he was obliged to abandon his studies and seek employment. In 1825 he went to Louisville to take charge of a bookstore, and soon after became a partner. The firm published a newspaper, the Focus, which, after several changes, survives as the Louisville Courier-Journal. Mr. Morton began publishing school-books about 1835. In 1838 he took Henry A. Griswold into partnership under the style of Morton & Griswold, and this firm continued up to 1855. About that time two sons of Mr. Griswold, with John B. Bangs, were admitted to the house, and the style was changed to John P. Morton & Co., thus remaining until the present time. Before this they began printing, which, with their publication of school-books and an extensive book and stationery store, soon made their business one of the very largest in Louisville. Later Mr. Morton took no active part in affairs, spending his summers in the East and his winters in Florida. He gave during his lifetime one hundred thousand dollars for a church home for females and infirmary for the sick, and by his will bequeathed sixty thousand dollars for benevolent purposes. His death was on August 19, 1889.

Moscas (Sp.).—Corrections marked on a proof (literally "flies").

Moscow.—The old capital of Russia. It has two hundred printing-offices, with about five thousand workers and apprentices, the numbers of the last being very great. The work-day has from ten to sixteen hours.

Mosquifero (Sp.).—A dirty compositor; one who has a great many corrections on his proofs.

Mostrenco (Sp.).—Matter cancelled by the author.

Motteroz, Claude, an eminent printer of France, who began the art after he had been employed as a die-stamper, an iron-ore sorter, a miner, a locksmith and joiner, and a washer of silver. He was born at Romanèche (Saone-et-Loire) in 1830. He began as an apprentice to M. Thioller at St. Étienne, and for a while was in a Lyons printing-office. Soon after this he began writing for L'Imprimerie, and has continued his connection till the present time. He has been its editor since 1868. About thirty years ago much interest was felt in the attempted substitution of old-style type for new style, which induced Motteroz to make a very thorough examination of the claims of this face upon modern printers. His conclusions were that the characters of to-day were superior to the older, but he also thought that a new style could be cut which should be as pleasing as either, while at the same time more legible. He noticed that both long and short sighted persons read with greater facility when the letters were rounder, possessed a uniform thickness, had short up strokes, and each letter was dissimilar to every other. The letters cut in accordance with this theory have ever since been in use in Motteroz's establishment, and range through the entire series of sizes. In result they are more legible than other modern French faces, and are very pleasing to the eye. His establishment is now very large, and has produced many masterpieces of the printer's art. His management of colors and engravings is very skillful. He has written much upon printing, his views being very suggestive and thoughtful, and he is the author of a number of books, including among them one upon Primogeniture. He

CLAUDE MOTTEROZ.

has also edited and published a series of school-books designed to inculcate morals, at the same time with other instruction. These have proved very successful.

Mottled Cards.—Cards with a mottled surface of various colors.

Mottled Paper.—Fancy paper made in various colors with mottled surfaces.

Mouiller (Fr.).—To moisten, to wet.

Mounting.—This is to place an engraving, a map or a page of matter upon a sheet of larger size by pasting, and the expression is further used by bookbinders to indicate that some map or illustration too large for a book in width or height is fastened by paper and cloth to the book in the place where it should be, being folded so that it forms a leaf. In England mounting is applied to the fastening of stereotype plates upon their bases, and to some extent the same expression is used here.

Mounting Wood.—The material, generally mahogany, on which stereotype or electrotype plates are mounted.—*Jacobi.*

Mourning Ink.—The glossy black ink used for the edges of mourning envelopes and letter-paper is, according to the Papier Zeitung, made of lampblack, borax and shellac. The ink is made as follows: In one litre of hot water sixty grams of borax are dissolved, and to this solution about three times the quantity of shellac is added. After this mixture has been properly dissolved the necessary quantity of lampblack is added, the whole compound being constantly stirred. Should the lustre not be satisfactory more shellac is added.

Mouse Roller.—A small additional roller for the better distribution of ink on a machine.—*Jacobi.*

Movable.—A general term applied to type to distinguish it from stereotype, &c.—*Jacobi.*

Moxon, Joseph, a writer on typography, whose work on this subject is the earliest we possess in English, was born at Wakefield, in Yorkshire, on August 8, 1627. He was brought up as a mathematical instrument maker, in which line of business he became very proficient. In 1665 he became hydrographer to the king, with a good salary, but six years before this entered upon type-founding, continuing in that business until 1683. He was burned out in the great fire of London, and after one or two removals went to Westminster, where he issued in 1669 the first complete specimen of types ever shown in England. Letter-cutting up to that time had been kept a mystery, so he complained, "and every one that has used it learned it of his own genuine inclination." The exhibition of letter was not good. The characters were not well cut, and the assortment consisted only of great canon, double pica and great primer Roman, and English, pica, long primer and brevier Roman and Italic. In 1676, having in the meantime also been a printer, he published a work on the proportions of letters, entitled Regulæ Trium Ordinum Literarum Typographicarum, or the Rules of the Three Orders of Print Letters, viz., the Roman, Italick, English—Capitals and Small; showing how they are compounded of Geometrick Figures and mostly made by Rule and Compass. He divides each letter of ordinary width into forty-two squares, and shows how they are made up of lesser parts. These figures are very suggestive, but they are too definite in some cases, leading to great stiffness, and in others are too loose. Type-cutting can never be reduced entirely to rule, for much must be left for the eye to determine. In 1683 he published the first of a more important work, which for a long time was the mine into which subsequent writers burrowed. It was entitled Mechanick Exercises, or the Doctrine of Handy-Works. A preceding volume, relating to smiths, joiners, carpenters and turners, had been issued in 1676. The typographical portion was two years in press. In this letter cutting and casting, with the arts of printing, are described with much minuteness, and it ends with a dictionary of typographical terms. The book is still referred to, and is regarded as very valuable. As a type-founder he produced the Irish type used in printing a New Testament and a Catechism, and did much other work. He retired from that branch of business in 1683, was made a Fellow of the Royal Society in 1678, and probably died after 1703.

Moyen (Fr.).—Medium.

Mudge, Alfred, the founder of the printing-office now carried on by his grandson in Boston, was born at Portsmouth, N. H., in 1809. He began setting type with Miller, in Portsmouth, but went to Boston in 1825, completing an apprenticeship with Samuel H. Parker, at that time a leading printer. In 1830 he began business for himself, but was burned out in 1834. He then removed to a new location, and in 1836 formed a partnership with George Dexter, the founder of the news firm of Dexter & Brother. This partnership did not last long, but during its continuance, as well as after, Mr. Mudge devoted himself to building up the job-printing business, at that time much neglected. In this he was successful, and for years his was recognized as the chief job office of New England. For several years he was the city printer of Boston. Alfred A. Mudge, his son, died on April 8, 1885, at the age of fifty-two. He was born in Boston, and was a graduate of the Brimmer School. He learned the printer's trade in his father's office, but having a taste for marine life he shipped before the mast when nineteen years old and went to San Francisco, the Sandwich Islands and the East Indies. On his return he became a partner with his father, who died about 1880. The business is now owned and conducted by his son, Frank H. Mudge, who was born in Boston in 1859, and received his instructions in all the various branches in his father's and grandfather's office. Frank H. Mudge was active in the formation of the Boston Master Printers' Club, and was its president in 1891 and 1892. He was also a member of the executive committee of the United Typothetæ during its first year, and first vice-president in 1890. His office is one of the largest in New England.

FRANK H. MUDGE.

Muestrario (Sp.).—Specimen-book of types.

Muleta (Sp.).—Muller or stone for grinding ink.

Muller.—A sort of pestle, usually of glass, employed for grinding pigments used in ink, or in mixing them.

Multicolor Letters.—Letters which can be printed in more than one color. They are frequently hollow, with a letter of another shape to work inside. For this reason these fonts require two characters for each one that is printed.

Multiple Mark.—A sign in arithmetic, thus: ×.

Munsell, Joel, one of the leading printers of the United States, was born in Northfield, Mass., on April 13, 1808. From fourteen to seventeen years of age, having previously been an assiduous student at school, he was employed at the wheelwright's trade; but he was apprenticed on May 24, 1825, to printing in the office of the Franklin Post, at Greenfield. The next year he was foreman. Some difficulty arising in the office he left the Post in 1826, and engaged on the Gazette in the same village. Its editor sold his interest in 1827, and removed to Albany, where he established a bookstore, with Munsell as general assistant. Six months later he began work again as a printer. During the next seven years he in turn published a small newspaper, was employed in the bookstore, visited friends, and was compositor or pressman in various offices. He also studied much. He became associated with Henry D. Stone in the publication of the Microscope, a journal of large circulation, in 1834, and in 1836 he began a job-printing office, from which he issued from time to time books and pamphlets as the publisher. His first work was an Outline of the History of Printing, which was a compilation only. A book brought out by him about 1850 was the Typographical Miscellany, which contained much upon the history of printing in New York State. The Annals of Albany in ten volumes, and the collections for the History of Albany, in four large octavos, reveal the spirit of an industrious antiquary. Dozens of other historical works were printed by him, owing very much of their value to his suggestions. Among them may be mentioned Sprague's Annals of the American Pulpit. One work by him of much value, although only a compilation, is his Chronology of Paper and Paper-Making. For many years his was one of the chief offices in which fine editions of biographical and historical works were printed, his reputation for skill being as high as that of any man in America. He lent much aid to the New England Historical and Genealogical Register, a most valuable repertory of facts, which was in danger of ceasing publication if he had not helped it. He was one of the original founders of the Albany Institute, and was a member of many learned societies. His printing-office was large and well equipped, the work being done with the utmost care. His typographical books, numbering over a thousand, were purchased by the State Library and are now on its shelves in the new building. He was an exemplary and painstaking man, and did much to advance the art by his endeavors. He died in 1880.

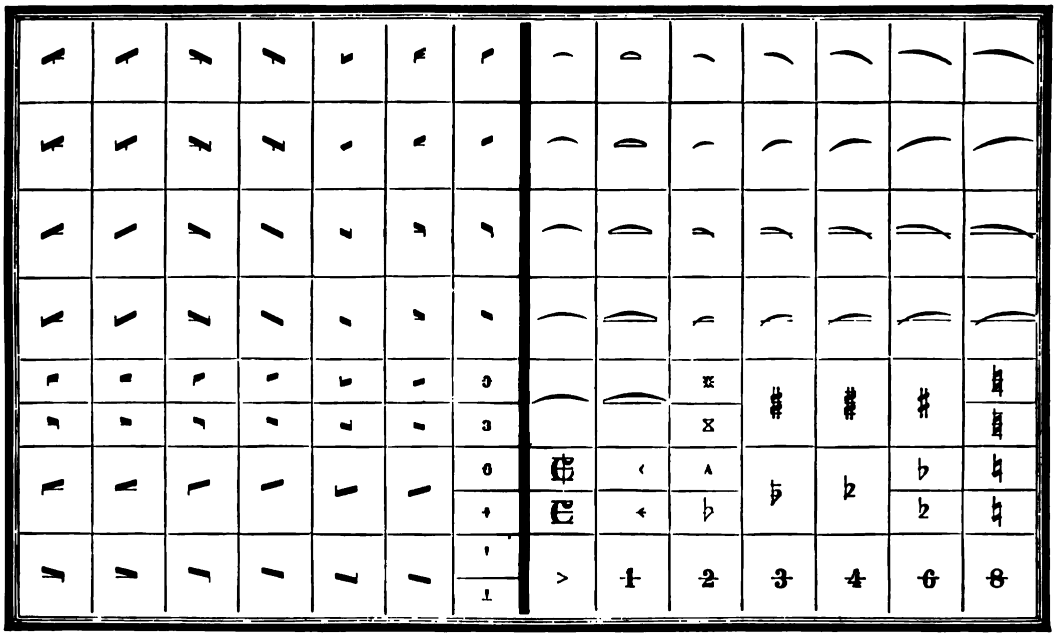
JOEL MUNSELL.

Munson Typesetting-Machine.—This apparatus was invented by James E. Munson of New York. In the storing and preliminary treatment of the type it closely resembles the older machines now in use in the country, holding type, nicked according to a graded system, in long, narrow reservoirs, and releasing them one by one by the pressure of a lever. In his machine the compositor is replaced by a perforator, who attends a little machine similar in appearance and action to that used in rapid telegraphy. An endless tape of strong paper is run between rolls and has cut through it a series of arbitrary combinations of holes corresponding to the letters, capitals, numerals and punctuation marks used in the ordinary case. The tape after the perforation is read by the proof-reader, who notes all corrections on it. Additional holes are then made to represent such corrections, to divide the tape into proper column lines, and, finally, to insert the proper spacing for accurate justification. That is, the corrections and the justification, as well as the original composition on the tape, are indicated by the perforations, the requisite changes being very quickly made. When this piece of copy is complete the roll is taken to the composing-machine and is fed into it regularly. As it runs along the perforations set free certain small levers, which are continually seeking to pass through, as in the organette, and each combination causes the corresponding type to drop from the reservoir to the carrier, and thence to the galley. If the copy has been properly corrected the galley is equally correct, and as the justification is done on paper there is no time lost in waiting for the spacing out of a line. Steam, electricity and hand power can each be used. By the employment of the perforating-machine a very much higher level of performance can be attained on the main machine, as there is no stopping while the compositor is considering his copy or is behind hand for any other cause. The expensive machine can be operated without supervision as fast as it will stand. Without this contrivance its performance is limited by the personal equation of the operator. The auxiliary machines are cheap and simple, and can be operated anywhere. The copy can be preserved for any length of time after preparation, and will still be available. The foregoing description applies to the machine and its mode of operation as heretofore exhibited. But in the future the inventor expects to do the justification entirely automatically in the types as they are set and without first indicating the justifying spaces with holes in the tape.

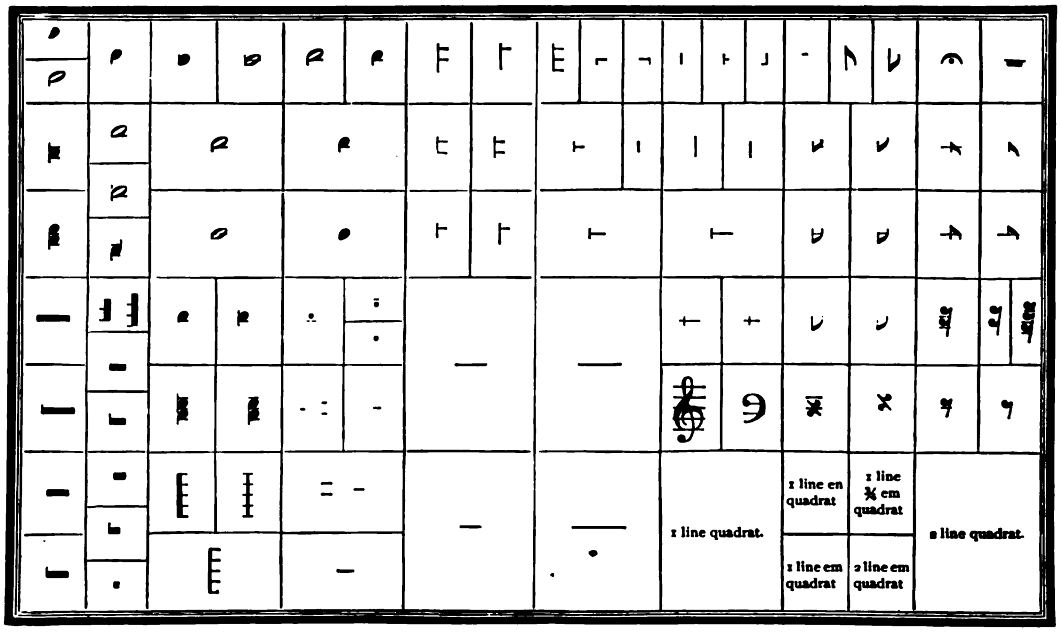
Music Cases.—Special cases of a complicated character employed in composing type-music. See MUSIC COMPOSITION.

Music Composition.—Much work was formerly done with music type, but this kind of composition has dwindled away, not one man being employed where four were formerly. The cause is the greater cheapness of lithography, by which, besides, ornamental lines of a beauty and grace which cannot be imitated by angular type can be introduced in title-pages. Movable type will always, however, be indispensable to some extent in this branch of the business. The principle upon which composition of this kind is executed is the same as that in tables. Every character is made of the width of an en, an em or its multiple, and joins perfectly with other characters. There is this important difference to be noted, however. The line is not set across the page at once, the rule then being lifted and the second line begun, but all of the lines on a staff are set together, and consequently the rule is not lifted before all are complete.

A reasonable knowledge of music is required to set it well; the compositor must be a man of judgment, to know how to give a good appearance to the page, and he needs a long apprenticeship to the music cases in order to attain any expedition. There are three prominent divisions in music, considered typographically. One is pitch. Whatever may be the length of the note it must be somewhere on the staff, or above or below it. If below the staff it is a low note; if above the staff it is a high note; and if on the middle lines and spaces it is a medium note. With the voice most of the notes are on the staff, and not above or below it. Length of sound is indicated by the openness of the note and the number of its terminations, the black notes with many hooks above or below being the shortest. Certain marks are used to indicate naturals, flats, sharps and ties, these being placed among the characters on the staff. Above the staff are to be found directions to the player or singer, sometimes in arbitrary characters, but more often in words, as "affetuoso," "largo," "piano" or "crescendo." These words chiefly come from the Italian, but English words are sometimes used. Below the staff are the words, which are spaced and divided so that they come exactly below the notes to which they relate. All notation is founded upon the staff. This consists of five lines and the intervening four spaces, covering nine notes. These lines and spaces denote different pitches, according as they are marked or according to the nature of the instrument or voice. Such markings are known as clefs, but an understanding frequently prevails that they are an octave or two higher or lower than would seem to be indicated. For instance, upon the tenor clef may be written a soprano part, and upon another tenor clef may be written a tenor part; yet the latter is sung an octave lower than the other.

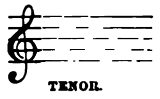


MUSIC UPPER CASE.

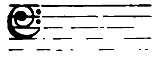


MUSIC LOWER CASE.

There are two common clefs, the tenor and the bass. The two are thus represented:

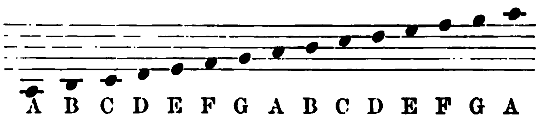


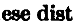
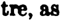
TENOR.

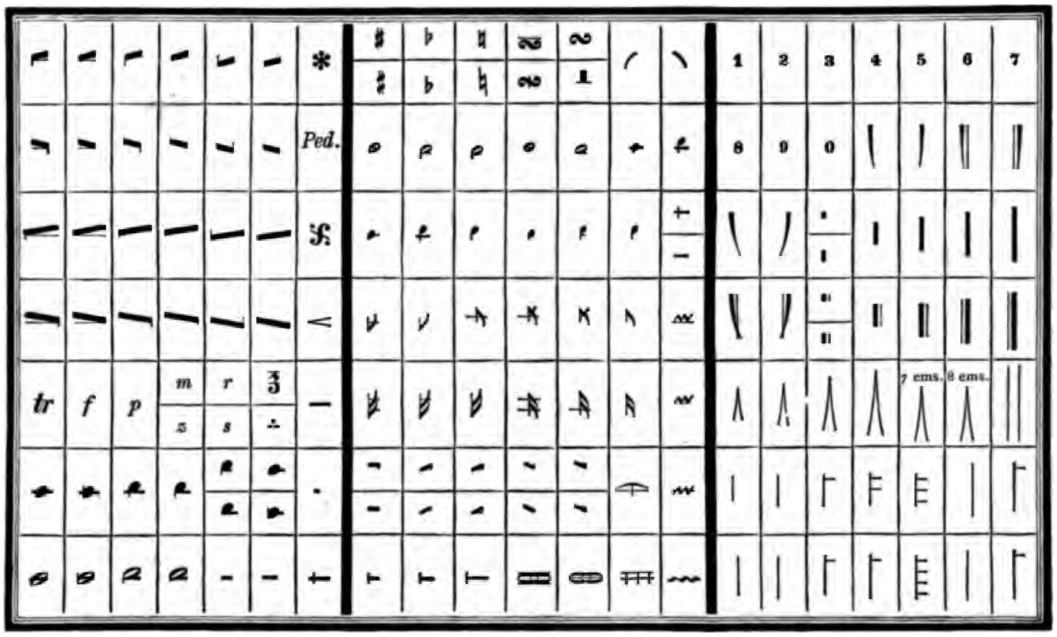


BASS.

The clef is always cast in one piece. The former indicates that the lowest line of the staff is E, and the latter indicates that the lowest line of its staff is G. The keynote of the major scale, or that in which the intervals follow the great mass of music, is C, and consequently the scale rises from that through C, D, E, F, G, A, and B to C again. The latter C requires on a harp or piano a string only half as long as the former, and each successive octave in rising divides the length of the string again. In going down to the bass notes each octave doubles the length. The bass clef begins at G and comprises besides A, B, C, D, E, F, G and A; the tenor clef begins at E, and comprises F, G, A, B, C, D, E and F. Where these are not enough added lines and spaces are used. These are continually occurring, for the ordinary compass of well instructed voices is two octaves, while the staff allows only ten notes. Some instruments have a compass of three octaves or beyond, as, for instance, the violoncello.

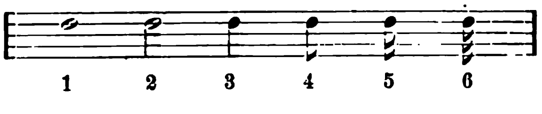


The five lines in the middle constitute with the spaces the staff; those above and below are added lines or ledger lines. Every note must be upon one of these lines or one of the spaces, and they are consequently known as line notes or space notes. There are two varieties corresponding to these distinctions. One has the bar through the centre, as: ; the other has the lines above and below, as: . There must also be notes for the ledger lines where the line above or below is shown, as: or . These of course are not very numerous. The other marks showing pitch are flats, sharps and naturals. There are in fact in music twelve notes instead of seven, as commonly understood, the additional five being interpolated between the others. In ordinary cases only the seven with the octave are used, but an occasional note is borrowed from the others. This is indicated by a sharp, showing that it is half a note higher than it would otherwise seem, as: ♯●; a flat depresses a note half way down to the next, as: ♭●. This depressing or raising continues throughout the piece until the natural key is restored, which is done by ♮●, known as a natural; but flats and sharps are used at the beginning of a musical composition to indicate what shall be the fundamental note of that piece. A song could be written in C, but found upon trial to be too low for the voice to do it justice, and the key is altered a little. Of course that raises it throughout. The fact that it is in C sharp is shown at the beginning, next following the mark of the clef, and wherever the keynote is fixed in any composition, whether in G, B or any other letter, it is similarly shown. A group of sharps indicates one keynote, and a group of flats indicates another. These marks are placed on the staff in a certain definite way, easy to learn. Naturals are never employed in this manner. They are always accidentals. It frequently happens that two parts in music are represented upon the same staff, as tenor and bass or soprano and alto. When this is done they rarely interfere. The notes of the bass voice are chiefly below the top line of the bass clef, and the tenor rarely reaches the two lower lines. One is placed directly over the other, according to the interval of time, the tailed notes in the tenor pointing upward and in the bass downward. When the two parts are in unison only one note is put in. If it happens that two notes next to each other are to be sung at the same time, a rare occurrence, the lower one occupies a position directly against the other on its own line or space. If one part has a rest, or is silent while the other goes on, a simple omission of the notes is enough in that place, but rests are also provided, and are requisite when a bar or more is silent.

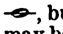
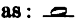


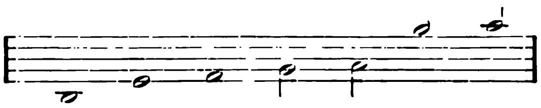
MUSIC SIDE CASE.

The length of time which a note should sound is a very important part in music composition. The length of a note is indicated by its form, and each of the smallest combinations is separated from the following and succeeding grouping by bars. The space between one bar and another is exactly the same in time, but it may be and is divided up differently. All notes being divisions of a whole note by two or its squares, the whole of the notes in a bar added together result in the same value. In

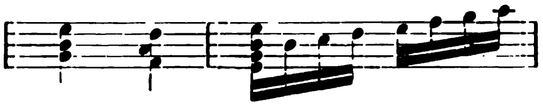


this way, or by counting up values, errors in writing the copy can be detected. For instance, if the notes are ¼, ¼, ⅛, ¼, ⅛, the bar is filled, as it will be if it is ⅛, ⅛, ¼, ⅛, ⅛, ¼. There are six kinds of notes—whole, half, quarter, eighth, sixteenth and thirty-second. There may also be a sixty-fourth, and double notes sometimes occur, in which case they are tied, or if vocal only one syllable is given to the two. These notes are indicated as shown just above.

The first is a whole note, the second a half, the third a quarter, the fourth an eighth, the fifth a sixteenth, and the sixth a thirty-second. It will be seen that the whole note and half note have open and the remainder have black heads; the half note and all others have a line drawn up or down from them, and the eighth note has a hook drawn from the bottom of this line, while each halving of the length of a note adds another hook. If there were a sixty-fourth it would have four of these attachments. It makes no difference in the music whether the perpendicular line with its hooks goes below the note or ascends to the top line of the staff. The only question to consider in this connection is the beauty of the page. Were there only these notes and the simple staff the work of the music compositor would be comparatively very easy; but as notes may be in any position on the staff or above or below it, and the stem or perpendicular line may descend or ascend, a number of other characters are called for, each to be employed in a particular place. Thus when a note is on a line the line extends a little at each end, as , but sometimes it is on one of the spaces, as : . It may be above or below the staff, in which case it may have only one line below it or above it, as : . All of these again are modified by the stem, as is shown below :

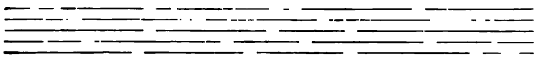


The black-headed notes have an equal variety. The stems are of greater or less length, as some must go from the top of the staff to its bottom, and others again show only enough to indicate what they are. The tails or hooks to notes turn up or down, two separate sets being made, and they must be contrived so that they can be above or below the line or partly above or below it. There are also level ties. Much ingenuity is required in putting together these ties so as to present a handsome appearance. In instrumental music tailed notes should be connected in groups of two, four or eight, so as to be more easily read; but in vocal music the tailed notes are separate or joined together, according as to whether one or two notes are required to be sung as one or two syllables. An example is here given of a couple of bars, in which several chords and two ties are shown:

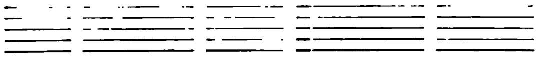


Chords, if of half notes or below, are connected by perpendicular stems. When they come closely together they are cast in one piece. A well-set chord has a very picturesque appearance, and it should be very carefully executed.

The size of each part across the page is equal. If there are three bars in one width of the page, the second part of the song or piece of music which harmonizes with the first should have three bars in the next width of the page. Each of the bars in the second staff should be directly below the bars in the other one. In consequence, if there are few notes in one and many in the other the characters in the latter must be brought together, and in the former they are spread apart. In many fonts characters are provided for this purpose or for more hasty composition, in which a vacant part of the staff can be put in at once. This is not an advantage, as the joinings in the lines, always somewhat imperfect, become painfully apparent when a light line runs through the entire joint. The longer the type is worn the more plainly this can be seen. In good composition the joints should be apart from each other, as in architectural work. An example is here given, the first showing the proper practice, and the second bad practice :



In the second the rules end and break together:



A space is placed at the end of each piece to make the gaps more apparent. A careful examination of music-books and a study of the art will show a multitude of characters, each intended to be used in a particular place and not elsewhere. The whole of them as commonly used will be seen in the diagrams of cases. A full font requires three of these, one being known as a side case. It has the less-used characters. All characters are upon bodies of determinate size, and as they cover nearly the entire head of the type they seem much larger than the letters of corresponding size. Nonpareil music will match long primer for magnitude of face. The diagrams given are from the foundry of MacKellar, Smiths & Jordan, and exhibit the common lay of the case in this country. Gilson of Boston and Armstrong of Philadelphia, who set more music than any other houses in America, have many special devices and faces peculiar to themselves. The MacKellar foundry makes five sizes of music, from excelsior (half nonpareil) to nonpareil, excluding pearl, and of some of these there are two or three forms. Diamond is large enough for most work. The excelsior should be used only when much compression is required.

In the composition of music attention must be paid to the spacing of the page, the allowance necessary to be made for added lines above or below, and to the words which indicate the manner of performance. In vocal music there are four parts, soprano, alto, tenor and bass, each to line under each other, with words of direction and with the lines of the text. Sometimes there will be five or six of the latter lines under each other. When the music and text have filled the width of the page all of these are transferred below and a new series of lines is begun. The page, therefore, must in this kind of music consist of four, eight or twelve parts. The distance should be nicely divided and spaced, each being given its just proportion. So, too, the second and third pages should have the same arrangement as to spacing that the first has, with the exception of the head. The words of the text must fall directly below the notes to which they refer, and consequently some music must be spaced out so that the text can come in. When the words are to crowd each other throughout the entire piece custom has reconciled us to seeing smaller type used, but where this crowding is only for a few words a syllable or two may be hooked down or up. We have, however, been in the habit of seeing condensed and extra-condensed type used, although the remainder of the line is in common Roman. Much of the text is spaced out. Wide spaces are left between the words, and the words themselves are divided into syllables, a hyphen being placed at each division, and enough space to permit these syllables to fall under their notes. The syllables are separated according to their real pronunciation, and not according to old rules. In instrumental music, particularly for instruments which have a wide range, much space must be allowed above and below the staff for additional lines.

There are two other known ways of writing music, for both of which type are cast. Gregorian or plain chant music has four lines to the staff, and the characters have other shapes than in ordinary music. The tonic sol fa system has sixty-three characters, and is set up in the stick like common work. Each character is upon determinate widths, and consequently the compositor knows the space to assign to each bar. A brass rule or space rule dropping perpendicularly denotes the bar. Length of time of a note and its pitch are indicated by the characters employed, which are nearly all those of the common alphabet, many, however, being changed somewhat.

The difficulties in the way of music-printing are great, yet attempts were made to represent song typographically at the very dawn of the art. Hans Froschauer in 1473 used wooden blocks, on which the characters had been engraved. Before this the staff alone had been printed, the characters being added by hand. Oct. Scotus of Venice in 1482 printed the staff at one impression and the notes at another. Erhard Oeglin of Augsburg in 1507 was the first to print music from type at one impression. He used characters on which were both the notes and the staff lines, the same principle which is employed at the present time. The early form of printed notes was square; this was followed by a diamond or lozenge shaped note head, and towards the latter part of the seventeenth century the present round shape was introduced. The earliest specimen of music in England was executed by Wynkyn de Worde in 1497. The earliest American printing in an English office was in 1770, when the New England Psalm-Singer, or American Chorister, was printed in Boston by Edes & Gill. Christopher Sauer was, however, the earliest on this continent. He issued a hymn-book at Germantown in 1753. This was in German. The credit for the first work in music has generally been given to Isaiah Thomas, who published Laus Deo at Worcester in 1786.

There are several methods of producing printed music besides through type. Engraving on copper is a slow and tedious process, and takes much time. Steel engraving is the same method on another material. Engraving on pewter is largely used in London. This material has been changed to one chiefly of tin. The lines are drawn, after which the notes are driven in by a punch. When the plate is complete the hollows are filled with wax. The roller is passed over the plate with printing-ink, and then the whole is wiped clean. Part, however, adheres to the wax. The sheet is laid on and an impression is taken, resulting in the printed page. The text is executed by letters stamped into the plate, one at a time. They are consequently very uneven. Transfers in the lithographic way are now thought to be an excellent plan for small editions. Sometimes the transfer is from a printed sheet of paper, but this does not give very good results. None of these processes are as good for long editions as typography. Music is rarely printed from the types themselves, which are very costly as well as very tender, but from electrotype plates.

Music Demy.—A size of printing-paper in England, 20¾ by 14⅜ inches.

Music of the Presses.—The noise occasioned in working presses in full swing is thus termed. The music of the presses, remarks Savage, before the introduction of cylindrical machines worked by steam engines, was a standing toast after dinner at all parties among printers, and he expresses a hope that it will never be neglected. He defines it: "When a house has sufficient business to employ all the presses within it, and a master printer walks through his pressroom when they are all at work and hears the creaking of the heads, the thumping of the balls, the noise of the running in and out of the carriage and all the other miscellaneous and to unaccustomed ears discordant noises, he styles them the music of the presses, which he declares to be the finest music in the world, as it brings grist to his mill."

Music Printing.—The art of printing music from type or plates.

Muslin.—A strong cotton cloth used for the covers of books. It is believed that the use of this material originated in England, and it is attributed by British authorities to Archibald Leighton, some time between 1820 and 1830. He is said to have bought the white muslin, sending it to the dyers and afterwards to an establishment where it was sized and calendered. The cloth was originally not embossed or stamped, but was perfectly smooth. The figure was made by engraving a design for the sides and back on a gun metal or brass cylinder, and this was transferred in reverse to a roll or cylinder made of compressed paper turned down in a lathe to the exact circumference of the pattern-roll. The cloth being passed between these cylinders the design became embossed upon it. This apparatus was superseded by the stamping and embossing press. All colors and qualities of cloth are now used. Most have some graining or small design on the surface, made by rollers after manufacture, but before they reach the bookbinder.

Mutton-Fist.—An index hand, thus: ☞; sometimes shortly called a fist.—*Jacobi.*

Mutton-Thumper.—An old term indicating a bad workman.—*Zaehnsdorf.*

Mutton-Thumping.—A term used in bygone days indicating the common binding of school-books in sheepskin.—*Zaehnsdorf.*

Myllar, Androw, the earliest printer in Scotland, issued his first book in Edinburgh in the year 1508. He was a practical printer, and had previously published a book giving an explanation of certain doubtful words in the Latin language. This was issued in 1505, at some place on the Continent, probably Rouen. In 1507 the King of Scotland, James IV., granted a patent or privilege to his loving servitors, Walter Chepman and Androw Myllar, to "bring hame ane prent" the books of laws and other matter that shall be called for. It appears from this that the chief object of granting this patent was that the Aberdeen Breviary might be printed under the supervision of William Elphinstone, Bishop of Aberdeen. This was in two volumes, the dates being 1509 and 1510. In 1508 Chepman and Myllar issued nine, if not all of a collection of eleven pieces found bound together in 1788. The principal one was the Maying and Disport of Chaucer. The type used in most of these pamphlets is a black-letter, with a large, heavy and not handsome face, on an English body. Nothing further is known of Myllar after 1510, and the common supposition is that he was dead. Walter Chepman, his partner, was a merchant burgess of the city of Edinburgh; he was also attached to the king's household, and was intrusted with the custody of the king's signet; he gained wealth, and in 1505 began buying land in various places. In 1514 and 1515 Chepman held the office of dean of guild of Edinburgh. He probably died in the latter part of 1528 or the early part of 1529, and was buried in St. Giles's Church, in which he had endowed a mortuary chapel. He is not known to have had any connection with printing after the completion of the Breviary. The next printer in Scotland was John Story, who published the Office of Our Lady of Pity, the date not being known, and he was followed by Thomas Davidson about 1530.

N

N THE fourteenth letter in English. This is one of those letters most used, only t, a and e being in more demand. It is rather thicker than an en quadrat, which, however, took its name from this letter. It differs from the u when inverted, as that has its serifs only on one side of its body marks, while the n has them on both sides. Standing alone, N. is used for note, the letter most commonly being in lower case. N. N. in the marriage ceremony, and by the Germans in modern Latin, is used to express a proper name which is not known to the writer. In Latin N. signifies noster (our), and on medals of the Lower Empire D. N. signifies dominus noster (our lord). It also often signified novus, nepos, nobilis. In geography and meteorology it stands for north. On French coins it means the mint of Montpelier. The Spanish alphabet has a character, ñ, called n with the tilde, and pronounced like n in onion, minion. N was frequently omitted in the first century of printing, a stroke being put over the letter before to indicate the fact. As a numeral N signified among the Romans 90, and with a dash over it 90,000.

N. P.—An abbreviation employed in England to denote a new paragraph.

Nachdruck (Ger.).—Reprint.

Nachdrucken (Ger.).—To reprint.

Naked Form.—A form of type waiting for, or stripped of furniture.—*Jacobi.*

Napier Machine.—Platen machines manufactured by Messrs. Napier in London.

Napier Press.—The press invented in England by David Napier and imitated in the United States by Hoe, Taylor and other early makers. Until after 1850 it was almost the only kind used in this country, but this press does not seem to have attracted much attention in England, where the press most associated with the reputation of the Napiers is a platen machine. Two of David Napier's inventions are of primary importance, the rising and falling cylinder and the employment of grippers to take the sheet and carry it through the machine.

Narrow.—The name in England of a furniture three pica ems in thickness. With broad it forms the combination broad and narrow. In the United States it is known only by its thickness in pica ems.

Narrow Measures.—Type composed in narrow widths, as in column matter. When this is done by the piece the workman should receive some additional compensation. If smaller than seventeen or eighteen ems of the matter he should receive two or three cents extra per thousand ems, and if less than fourteen ems five or six cents. Below twelve ems matter should only be composed on time.

Nature Printing.—A method of producing impressions of plants and other natural objects in a manner so truthful that only a close inspection reveals the fact that they are copies. According to Ringwalt, whose description is copied, so deeply sensible to the touch are the impressions that it is difficult to persuade those who are unacquainted with the manipulation that they are the productions of the printing-press. The process in its application to the reproduction of botanical subjects represents the size, form and color of the plant, and all of its most minute details, even to the smallest fibres of the roots. The distinguishing feature of the process, compared with other modes of producing engraved surfaces for printing purposes, consists first in imprinting natural objects, such as plants, mosses, seaweeds, feathers and embroideries into plates of metal, causing the objects to engrave themselves by pressure; and secondly, in being able to take such casts or copies of the impressed plates as can be printed from at the ordinary copperplate press. The art is by no means new in idea, many persons having attempted something analogous to the present process and produced results which were imperfect, merely because science had not yet discovered an art necessary to its practical development. It is to the discovery of electrotyping that the existing art of nature printing is due, and it was first practiced on an extensive scale in the Austrian Imperial and Royal Printing-Office.

The plant, perfectly dry, is placed on a plate of fine rolled lead, the surface of which has been polished by planing. The plate and subject are then passed between rollers, by the pressure of which the subject is forced into the surface of the lead. The leaden plate is subjected to a moderate heat, by the action of which the subject is loosened from its bed and easily removed. This mold is then subjected to the electrotyping process, the second shell being a perfect fac-simile of the leaden mold. When the subject to be printed is of one color only that pigment is rubbed in, and any superfluity is removed; but when it is of two or more colors the process is simple but, it is believed, perfectly novel compared with any process of printing heretofore practiced. In the case, for instance, of flowering plants having stems, roots, leaves and flowers, the plan adopted in the inking of the plate is to apply the darkest color, which generally happens to be that of the roots, first; the superfluous color is cleaned off; the next darkest color, such perhaps as that of the stems, is then applied, the superfluous color of which is also cleaned off. This is continued until every part of the plant in the copperplate has received the right tint. In this state, before the plate is printed, the color in the different parts of the copper looks as if the plant were imbedded in the metal. The plate thus charged, with the paper laid over it, is placed upon a copperplate press, the upper roller of which is covered with five or six layers of blanket of compact, fine texture. The effect of the pressure is that all of the colors are printed by one impression, for when the paper is removed the resemblance of the plant is seen quite perfect, highly embossed, with the roots, stems and other parts, each of its proper tint.

Near Cheek.—The upright in a press nearest the pressman.

Near Side of Press.—The side of the press nearest to the workman.

Nebraska.—In this Western State printing did not begin until 1854, when it was introduced at Belleview. In 1856 a newspaper was begun at Brownville. The total number of journals published in 1860 was 14; in 1870, 42; in 1880, 189, fifteen of which were issued daily.

92 there were 32 daily and 592 other periodicals.
wo principal cities are Lincoln and Omaha, in each
ich much printing is done.

ck of a Letter.—The sloping part of a type from
iank to the face of the letter. This term is from
i. It is never heard in the United States, where
ioulder, the beard or the bevel of a letter is the
employed.

sbitt, George F., a printer of New York, was
n that city in the year 1809. He was apprenticed
eph C. Spear to learn the art of printing, and be-
ie came of age was intrusted with the conduct of
isiness, afterwards becoming the partner of Spear.
t 1835 he began the manufacture of wood type,
was then comparatively new, and continued it for five or six years. In 1840 he planned a machine to produce several colors at one impression, which was a success. In a few years after this his establishment became the largest job office in the city, probably doing more work in this line than any other in the United States. In 1852 he secured an order from the Postmaster-General for the manufacture of an envelope with a stamp upon it. Envelopes had only been used to any extent for half a dozen years, and postage-stamps were also new.
ttempt in England to make a combined stamp and
ope up to that time had failed, but Mr. Nesbitt was
o succeed. He also manufactured blank-books,
ry envelopes, cards, and was a lithographer and
ner. For some years eight buildings were required
lch to do the work, and a thousand persons were em-
d. He was a considerate and just employer, and a
friend of the Typographical Society. He died on
7, 1869. The business is now carried on by James
, who was admitted into partnership in 1850, and
nd F. Martin and Frederick A. Harter, admitted
under the firm-title of George F. Nesbitt & Co.

GEORGE F. NESBITT.

ttoyer (Fr.).—To clean.

vada.—Nevada is one of the Rocky Mountain
. It has a sparse population and no large city.
rincipal towns are Carson City, with three news-
s, and Reno, Elko and Virginia City, with two
The total number of daily papers issued in the
is 10, and of other periodicals 16.

w England.—A group of States in the north-
n part of the United States of America, compris-
laine, New Hampshire, Vermont, Massachusetts,
Island and Connecticut. Their aggregate popu-
is 4,700,745, and the area covered is 72,005 square
Here printing was first introduced in the United
, the original printer, John Daye, beginning work
9 at Cambridge. Boston also preceded all towns
t Cambridge, work beginning there in 1676. Con-
ut introduced the art at New London in 1709,
Island at Newport in 1732, New Hampshire at
nouth in 1756, Vermont at Westminster in 1781,
laine at Falmouth in 1780 or 1785. More than half
printing in the colonies before the Revolution was
ted in this part of the country, which comprised
ut of the original thirteen States, Maine then hav-
en a district of Massachusetts, while Vermont was
d by both New Hampshire and New York. In
ourteen out of the thirty-seven newspapers in the colonies were published in New England, and in 1810 there were 78 out of 366 in the United States, and having over a third of the entire circulation. In 1835 it published 272 newspapers out of a total in the Union of 1,258, and it had two-ninths of the circulation. In 1892 there were there issued 1,201 out of a total of 18,714. The chief cities for the amount of printing executed are Boston, Providence, Hartford, New Haven, Springfield and Worcester. This region is also the centre of the paper industry.

New Hampshire.—Only two printing houses were opened in New Hampshire before 1775, the first being at Portsmouth. Daniel Fowle, who had been arrested and imprisoned in Boston on a charge of libel, was solicited by several gentlemen of Portsmouth to set up a press in that town, and did so in 1756. His newspaper was called the New Hampshire Gazette. In September, 1764, he took his nephew, Robert Fowle, into partnership. They remained together until 1774, Daniel Fowle continuing the business up to the time of his death in 1787. Thomas Furber, who had been an apprentice of Fowle, opened another printing-office in Portsmouth in 1764. Robert Fowle began an office in Exeter in 1764, and shortly after a newspaper appeared under his control. At the beginning of the Revolutionary War he was charged with counterfeiting the currency of New Hampshire, and fled to Canada. Newspapers were begun at Gilmanton in 1802 and Manchester and Concord in 1790. Apart from newspapers, no large amount of printing has been done in New Hampshire, the principal towns in this respect having been Concord, Manchester, Claremont and Portsmouth. The number of newspapers and periodicals published in 1810 was 12; in 1840, 27; in 1850, 38; in 1860, 20; in 1870, 51; in 1880, 87. They were divided in this last year into 10 daily and 77 other periodicals. In 1892 there were 15 daily and 116 other periodicals.

New Haven.—James Parker, the principal printer in New York, was appointed postmaster of New Haven by Benjamin Franklin in 1754, and there set up a press. The first work he produced was the laws of Yale College in Latin. John Holt was his partner and managed the business, Parker chiefly being in New York. In 1764 Benjamin Mecom succeeded them in the printing-office, and also became postmaster. In 1767 Thomas & Samuel Green began, their partnership continuing until the death of Samuel in February, 1799, at the age of fifty-six. Thomas Green died in 1812, the business being continued by Eli Hudson. Since that date much printing has been executed in that city, and it now maintains a rank far greater than would be justified by its population. There are now issued in New Haven 7 daily and 25 other publications.

New Jersey.—This State lies between the cities of New York and Philadelphia, and consequently has grown very rapidly from their overflow. Printing was introduced at Woodbridge by James Parker, a New York printer, although Keimer and other printers had occasionally removed a part of their offices to some place in that colony to print paper currency or other work for the Government, afterwards returning. Keimer in 1727 executed work for the colony at Burlington, Franklin being his foreman, and there are some Philadelphia antiquaries who hold that it was at Burlington that Bradford first began work in 1685, his office then being described as "near Philadelphia." James Parker was born at Woodbridge, and began business there about 1751. He printed, among other things, a folio volume of the Laws of the Province, and he also issued a magazine. To accommodate the printing of Smith's History of New Jersey in 1765, Parker removed to Burlington. When the work was completed he returned to Woodbridge. Isaac Collins, a Quaker, began operations at Burlington in 1770. In 1777 he published a newspaper. He afterwards removed to Trenton, where he printed a very correct quarto edition of the Bible, the proof being read many times and last by his daughter, who was very accomplished. He afterwards removed to New York. Gaine changed from New York to Newark early in the War, soon returning, and Shepard Kollock began a newspaper at Chatham when the conflict was half over. Printing was practiced in several other places before 1800. At the present day it is carried on most largely in Newark, Trenton and Jersey City. The total number of newspapers issued in 1810 was 8; in 1840, 33; in 1850, 51; in 1860, 90; in 1870, 122; in 1880, 215, of which 27 were daily issues. In 1892 there were 45 daily and 315 other periodicals. Of these 20 were printed in Newark.

New London.—The first printer in New London was Thomas Short, in 1709. This was the fourth town in the United States in which the art was practiced. Timothy Green followed him in 1714, Samuel Green a few years later, Timothy Green, Jr., in 1758, and Timothy Green, 3d, in 1763. At present three daily and one other periodical are issued there, and there are several job offices.

New Mexico.—This territory lies at the southwest corner of the United States, and was acquired from Mexico. The principal towns are Albuquerque, Las Vegas and Santa Fé. Printing has been carried on there from 1862, if not before. In 1880 there were 17 regular publications printed in the territory, of which 3 were issued daily, and in 1892 there were 5 daily and 50 other periodicals, as appears by Rowell.

New Orleans.—The chief city on the lower Mississippi River. Printing began here in 1804. It was introduced by the French, and the first venture was Le Moniteur. The same year a newspaper was published in English. Both languages have been concurrently used up to the present time. Job printing is extensively done, and there is considerable bookbinding. In 1892 there were 9 daily and 47 other periodical publications printed in the city.

New Par.—An English abbreviation, written upon a proof to show that a new paragraph should be begun there. It is not used in America.

New Paragraph.—The beginning of a new verse or subdivision of a quantity of reading matter, more important than a full stop. The preceding words are quadded out to the end of the line, and the new paragraph begins on the next line, being indented an em on most matter.

New York.—The principal city in the United States and that in which the fourth printing-office in the country was established, being preceded in this respect by Cambridge, Boston and Philadelphia. The original printer was William Bradford, who had removed from Philadelphia. He began operations on April 10, 1693, as appears from a warrant drawn on the treasury in November of that year for six months' salary. Until 1726 he had no rival, when John Peter Zenger, one of his apprentices, started in opposition. In the preceding year Bradford had established the New York Gazette, a weekly paper, the first number of which appeared on October 16. Zenger began another newspaper, entitled the Journal, on November 5, 1733. These two papers represented different parties. Bradford's publication lent support to the administration of Governor Cosby, while Zenger's pointed out its shortcomings. As a result Zenger was arrested and tried for libel. He was thrown into jail on November 17, 1734, but could not obtain a speedy trial. With the exception of the prosecuting attorney, the lawyers favored Zenger, and on preliminary hearings his counsel denied the validity of the court. The judges were incensed, and directed that Alexander and Smith, the offending persons, be struck from the list of practicing attorneys. A lawyer of Philadelphia of high reputation, Andrew Hamilton, and John Chambers of New York then undertook Zenger's defense. The sentiment of the public was with the prisoner, and Hamilton, by skillfully attacking the general construction of the law of libel, and insisting upon the right of the jury to inquire into the fact whether the publication alleged to be a libel was in fact really one, obtained a verdict of not guilty in spite of the repeated rulings of the judges against him. Hamilton was given the freedom of the city in a gold box, and much popular rejoicing followed. This trial and that of Bradford in Philadelphia in 1692 established a construction of the law of libel in America from which it has not since varied, although not always borne out by the law or by the laws of England.

Zenger died in 1746, and Bradford in 1752. The most important of the early printers succeeding them was James Parker, also an apprentice of Bradford, but who ran away from him and was with Franklin at Philadelphia for a number of years. He died in 1770. Parker exceeded in skill his predecessors. Contemporary with him was Hugh Gaine, and in the last few years of his life James Rivington. Parker died just before the Revolution, but Gaine and Rivington, who took the British side in that struggle, remained here after it closed. Other early printers were Samuel Loudon, Henry De Foreest, John Holt and William Weyman. During the Revolutionary War the papers, of which there were four, were published on five days of the week, one being issued twice. Their circulations were much larger than in times of peace. Prices grew so high for provisions and firewood that Rivington's printers once struck for higher wages, as they could not live on what they were then obtaining. This was the first strike in the printer's trade in America. When the war ended several of the printers went to places in Canada or other parts of the British dominions, and Holt and others returned. They had been forced to leave the city at the beginning of hostilities, and some had been compelled to remove again and again. A celebration of the adoption of the Federal Constitution was held in 1789, at which Loudon officiated as a marshal of the printers' division. The number of printing firms in 1789 was twelve, their names being Thomas Allen, Berry & Rogers, Samuel Campbell, William Durrell, Hugh Gaine, Harrison & Purdy, Robert Hodge, Samuel Loudon, Robert McGill, William Morton, John Reid and James Rivington. Allen, Hodge & Campbell were employed together in several enterprises, including the first New York Bible; Durrell was a publisher of children's books and small illustrated works; Reid and Berry & Rogers were chiefly booksellers. Among those who appeared shortly after were Evert Duyckinck, who was a bookseller for forty years, and established many youths in business in other towns, as Franklin had done before him; Thomas and James Swords, two brothers, sons of a British officer who died before the Revolution, the young men in time becoming great publishers of Episcopal and other religious books; and Ross, the printer of Congress. By 1805 several new names had appeared. They were Michael Burnham, William A. Davis, Deare & Andrews, John Lang, Ming & Young and John Turner. It appears from contemporary documents that there were at that time less than a hundred journeymen in the city and about twenty masters. The leading employer of that day was George Folliot Hopkins, taken to New York by Noah Webster when he became an editor. Immediately after him, and his contemporary also, was Jonathan Seymour, who when he died in 1841 left a large fortune. George Long, previously a soldier in the British army, did most of the classical work, as well as that in Spanish.

The standard of performance in New York during the last century and in the early part of this was equal to that of English provincial towns, but did not equal the best produced in London. Type was not manufactured in the city until about 1790, when Mappa, an ex-lieutenant in the Dutch service, began casting. He continued this up to 1795. No other regular type-foundry was begun until Elihu White removed to New York from Hartford in 1810, although Dr. Lothian had executed some work in this way. Ink began to be manufactured by

Prout at a date variously assigned as 1805 or 1809. Mather & Donnington, the second ink-makers, established themselves in 1816. At about this latter date iron presses began to be used by daily newspapers, although book offices did not adopt them until six or eight years later. The first iron press was apparently brought to New York in 1811. There was only one paper dealer in the city before 1812. His name was Valentine, and he probably disposed only of the product of the mill at Roslyn. Hard papers were imported and were sold by all merchants. Each printer was obliged to lay in a stock every winter of all the book and news paper he required, for the sloops which brought this article from the interior were prevented from making their usual trips at that season by ice. It was customary for Jonathan Seymour to have a liberal supply, and he often sold a little to his neighbors when they ran short. He was in easy circumstances, and about 1818 the manufacturers urged him to allow them to leave some paper with him for the winter, for which he could account in the spring if it were not returned. The experiment was successful, and others soon began selling. Among them was Ichabod Hoit, who kept the first printer's warehouse. In 1812 David Bruce, of the firm of D. & G. Bruce, determined to learn the art of stereotyping. He went to England, and after much trouble, there being then only two stereotypers at work in the United Kingdom, learned the principles. Returning he put them into practice, but another printer, John Watts, an Englishman, anticipated him somewhat in actually preparing plates. The Shorter Catechism was issued by him in 1813. Watts continued only two or three years in the practice of the art in New York, when he returned to Europe. Bruce was more successful in making a good plate than his English contemporaries, as he shaved instead of turned the bottoms of the plates in order to make them level. B. & J. Collins succeeded Watts, and another early stereotyper was Adoniram Chandler. White, the type-founder, and James Conner also became stereotypers. The latter was led by this means to become a type-founder, but continued stereotyping. The Bruces had at the beginning much difficulty in getting type with a square shoulder, which is best for stereotyping. The two American foundries declined to make the type as the Bruces desired it, believing that stereotyping, if successful, would soon act disastrously upon the type business, as printers would not then need to buy so much. David Bruce and his brother therefore determined to begin letter-founding, and were so successful that in a few years they abandoned their former calling, as they had before abandoned printing. The three foundries mentioned, Conner's, Bruce's and White's, the latter as A. D. Farmer & Son, continue to be the principal foundries, no other having lasted a half century, although Lothian was an excellent workman, and Hagar and others carried on business for some time.

In 1825 another parade of the printers took place in honor of the completion of the Erie Canal. There might have been two hundred and fifty journeymen printers in the city at that time. Printing, however, was beginning to change. Composition rollers were talked about, and in the next year were made; iron presses were manufactured in the city by both Turney and Hoe; the Treadwell press, a union of the hand-press and power-press, had been put into operation by Daniel Fanshaw, who in 1829 mortgaged his place to buy nine more power-presses; paper dealers were numerous, and four establishments, destined in a few years to exceed anything previously known in America, had been started. The Bible Society was founded in 1816; the Methodist Church established a printing-office in 1824; the Tract Society dates from 1825, and Harper & Brothers from 1817. The Harpers were men of great quickness and judgment, as well as industry, and understood how to lay out work for others. Until this firm became successful both Boston and Philadelphia were far in the lead in book publishing. After they became strong they developed new methods of carrying on business, and the book trade slowly gravitated towards New York. In 1830 the Harpers and the Methodist Book Concern had each over thirty hand-presses at work; in 1809 the largest office in this city had only nine wooden presses, capable of doing only half as much as the same number in iron. Much of the development of the printer's art in New York and in America was due to the constructive skill of the different members of the Hoe family. All tools, implements and machinery were better made by them after 1830 than similar articles were manufactured in England. A great impetus was given to newspapers by the lowering of price in 1833 and later. Until that time the circulation of a daily paper in New York did not exceed twenty-five hundred, if successful; it might not have been more than two or three hundred. After new journals were established at a low price twenty thousand was occasionally reached. The total number of compositors on the largest daily paper in 1825 was eight; in 1850 the chief daily employed forty.

In the decade between 1830 and 1840 many new printers came in, as Seth W. Benedict, John F. Trow and Robert Craighead. There were new type-founders and new ink-makers; paper was made in large sheets, the Fourdrinier machine having become common; machines for printing had been invented by Adams, Tufts and Hoe; cloth binding had been introduced; there were several wood-engravers; blank-book making had become a business by itself, and weekly newspapers and monthly magazines were common. Each political campaign started a number of journals, of which some survived. There were a number of respectable firms in the book trade, which was brought together in 1832 for the first time, except at a trade sale, to welcome Washington Irving back to his own country after a long absence. Trade was carried on nearly the same as now, except that capitals were very small and payments were difficult to obtain. It is estimated by a very competent authority that in 1842 there was no printer, not a publisher, who had a capital of $25,000 invested. The Sun was printed for a long time by a man with a crank, and the Tract Society and Harpers drove their first presses by a mule or horse hoisted up by a tackle each morning and returned to the level of the earth in the evening.

The present commanding position of New York city is due to the fact that the Hudson alone among rivers penetrates great mountains without a rapid or a cataract. At the distance where it is no longer navigable by large vessels it was practicable to make an artificial waterway to connect it with the great lakes. This canal was completed in 1825, and the city since then has grown with great rapidity. During the last few years it has become the centre of almost all speculation, except in products of the farm, and multitudes of rich men have settled there, as being able to control their enterprises better and live more luxuriously than anywhere else. As a result the amount of printing has increased prodigiously. A census four years ago showed thirteen hundred large power-presses, probably now increased to fifteen hundred. The number of compositors is estimated at 6,500, and of pressmen at 1,500. This number will compare with those in each decade from 1800 as follows: 1800, 75; 1810, 125; 1820, 200; 1830, 500; 1840, 1,200; 1850, 2,000; 1860, 3,000; 1870, 4,500; 1880, 6,000; 1890, 8,000. The business has been subdivided, few firms not having a specialty.

The amount of capital employed has been increased. Some establishments now require upwards of half a million of dollars. There are now in the directory seven hundred and thirty-two competing book and job printing-offices, mostly in the lower part of the city. The streets in which they are most numerous are John, Fulton, Ann, Beekman, Spruce, Frankfort, Duane, Reade, Chambers, Vesey, Barclay, Park place, Warren, Church, Nassau, William, Gold, Pearl, Vandewater and Rose. There are also newspapers with their own offices, and many commercial firms do their own printing. It is therefore safe to say that there are about nine hundred printing-offices in the city. In the upper part of the town there are a number, many of them of considerable magnitude, but not very close together. Few letter-press offices do lithographing, although this word may appear on their cards, but many include electrotype foundries and pamphlet binderies.

Among the noted printers of New York since the beginning of the century, besides those already mentioned, excluding living ones, except when they are near the Psalmist's allotted age of man, have been George P. Morris and Samuel Woodworth, the poets; Peter Force, the American annalist; Horace Greeley, the editor of the Tribune; William L. Stone, the author and editor; General Daniel E. Sickles and his father, George G. Sickles; John A. Gray, Stephen Angell, Corydon A. Alvord, John L. Jewett, William C. Martin, William Van Norden, Francis Hart, George F. Nesbitt, George P. Scott, William E. Dean, Peter C. Baker and Daniel Godwin.

Of late years New York has been the centre of press-making, ink-making and paper dealing. Over fifteen press manufacturers have offices there, and one very large shop manufactures within the city limits. Ink-makers have their offices in New York, but their factories are chiefly on Long Island or in New Jersey. Paper dealers are very numerous on Beekman, Nassau, Spruce, William, Duane and Reade streets. This city is also the headquarters of manufacturing and wholesale stationers. The lithographing trade is carried on very extensively, and there are several supply-houses for that branch. Bookbinding and blank-book manufacturing are large industries, and both wood-engraving and process-plate manufacturing employ many hands. It is said that there are fifteen hundred in the latter occupation. There are twenty-five electrotyping establishments and two manufacturers of wood letter.

Wages of workmen were very low at the beginning of the century. The establishments then were very small, not averaging over two or three journeymen each, and the emoluments derived by the employer, who always wrought as diligently as his men, were scarcely more than would support life. In the last century rates could not have exceeded three or four dollars a week. Hugh Gaine, who was a journeyman when he came to America, received a dollar and an eighth a week for wages after arrival and found himself; afterwards he had a small advance. In the first proposed New York scale, which is also the earliest in this country, the journeymen asked for certain definite sums, very small in comparison to those now paid, but evidently an advance on those given at that time, the year 1800. Compositors on bookwork were to have seven dollars a week, but those on daily papers, a more exhausting occupation, demanded eight. All pressmen were also to have eight dollars. Board for mechanics was then worth from a dollar and three-quarters to two and a quarter a week. All other things, except rent and some kinds of food, did not differ much from the present standard. There were no regular hours, but they averaged eleven or twelve, and remained at eleven until about 1830, when the Legislature fixed the standard of hours of labor at ten for mechanics when there was no special agreement. In woolen and cotton factories the hours remained at twelve until about 1868 or 1869. Piece-work, of which there was little, except on press, was twenty-five cents a thousand ems in 1800. Time-work was twelve and a half cents an hour. In 1809 rates were advanced, the prices demanded being nine dollars. In 1815 a strike lasted a long time indecisively, and from that time on no new rates were made. From nine to ten dollars a week was asked, but some men worked for seven and some for eight. This tariff practically existed from 1815 up to 1850. Twenty-five cents were given on morning newspapers in the earlier half of this time. Even this was cut down by three daily papers about 1830. No high prices were paid in any positions. Three foremen united in 1850 to form a new printing firm. They were very able men, and each afterwards made a fortune. One of them, whose office was the largest in the city, received twelve dollars a week where he had been employed; one of the others obtained ten, and the third nine. All were excellent workmen and good managers. In only one case did the proprietor try to retain the man who was about to leave. Out of the twenty-five cents the workman received in a book office in 1840 must have been deducted his lost time in making up, then estimated at two cents a thousand. In 1852 weekly hands on newspapers received, after an advance which occurred in that year, twelve dollars a week, and book and job hands had eleven. Piece-work was on books thirty and thirty-two cents; on weekly newspapers thirty-one, and on morning newspapers thirty-five. The schedule immediately previous was twenty-eight and thirty on books, and on newspapers twenty-eight and thirty-two. There was no advance on this until during the late war, when rates rose by steps to sixty cents a thousand on morning newspapers, and eighteen dollars a week for weekly book hands. This was afterwards advanced to twenty and twenty-two dollars, but the daily rate fell off to fifty-five cents. Several years after the war ended further drops were made, until nearly the present rate was reached, of eighteen dollars a week for those employed on book and job work, forty-six cents on morning papers, and forty cents on evening papers and weeklies. This has since been advanced to fifty cents on morning papers. Pressmen receive twenty dollars a week, and feeders from eight to fourteen dollars a week, according to the establishment and the kind of labor performed. This is one-half more for feeders than was paid six years ago. They are a very turbulent and uneasy set of large boys and young men, compelled to labor at low rates because their work is no trade and is easily learned, and yet they have all of the expenses and desires of other young men. Proof-readers are paid from the weekly scale to three or four dollars more. Most offices having only a man or two occasionally employ young men at from ten to fifteen dollars a week on job-work, but in all of the large offices the full scale is paid. Just at present there is much agitation about a reduction to nine hours. If this should come to pass it is not likely that weekly rates will be reduced, as a man's expenses do not fall off when his hours of labor are shortened. The present rate, considered as to its purchasing capacity, is the highest ever paid in New York. Rent is the only thing which has more than doubled since the beginning of the century. Some articles of food are nearly twice as high as then, but some are no higher. Clothing as a whole is cheaper.

The associations controlled by the journeymen in this city have been numerous. The first was founded in 1795, having for officers the next year Thomas Ringwood as president, and Henry C. Southwick as secretary. It apparently died before 1799. In 1800 a society known as the Franklin Typographical Association was established for "the promotion of harmony among journeymen printers and for philanthropic purposes." John Clough was president and David Bruce vice-president. After 1804 nothing more was heard of it. In 1809 the Typographical Society, which still exists, was formed. It was a trades-union, and made that a prominent feature. The founder was David H. Reins. Its first formal meeting was on July 4 of that year. Shortly after it inaugurated a strike, and in 1815 was occupied with another. One of its earliest proceedings was to expel a member for ratting, and soon after it investigated the conduct of several members who, as was alleged, worked at Flatbush, Long Island, under price. The first president, John H. Sherman, spoke disrespectfully of the society when it refused to pay a bill which he had presented before it was audited and scrutinized, and he also was expelled. In 1816 it asked Thurlow Weed, one of its members, who had some acquaintance in Albany and who was going there again, to see if he could not procure it a legal incorporation. The idea seemed preposterous to the members of the Legislature whom he consulted, and he was unable to obtain what was sought. This was Weed's first experience with the Legislature. Subsequent applications, however, proved successful, and in 1818 it was incorporated, but with a clause which forbade it to set or regulate prices. The society accepted this, and of course lost its character as a trades-union. It was from that time solely a benevolent society. Its original object, as we learn from a printed circular sent out by it in 1824, was "the accumulation of a fund by monthly contributions for the purpose of assisting those who might be reduced to want by sickness. Another object contemplated was the regulation of the trade as far as journeymen were concerned. With these views the society continued for eight years, the experience of which convinced its members that their labors to promote in any efficient manner the last-mentioned object were unavailing." A library was established by them on November 1, 1823, which lasted about sixty-five years, and was very useful. It numbered about three thousand volumes. During its long career the Typographical Society has helped the sick, the widow and the orphan, and has buried the dead. Nothing has been squandered, and it has lost very little by malfeasance of officers. For many years after 1849 it held a festival or grand dinner on Franklin's birthday, and the addresses made at these meetings have preserved much of our typographical history. In its first decade it was favored with odes by Woodworth, who was one of its members, and orations by others on each Fourth of July. In its earliest years it included among its active members Peter Force, the annalist; Lewis, afterwards Chief Justice of Pennsylvania; Morris and Woodworth, the poets; Weed, the American Warwick, and Johnson and Conner, the type-founders. Each of these served on many committees. The membership of this society never exceeded two hundred, and it is now rather less than a hundred. It holds its meetings in the rooms of the Typothetæ.

It was felt, after the abandonment of the clause regulating labor, that something more was necessary, and the Franklin Typographical Association was formed in May or June, 1831, John Windt being president. The membership included many of those in the Typographical Society, with some others. A list of prices and accompanying circular for the information of the trade was immediately printed, and in September it was moved by Mr. Flanagan that "as soon as a correct list of the rats now employed in this city can be obtained the said list be printed and circulated in every city and county of the Union." In February ensuing the resolution was put into operation. It is understood that this was chiefly aimed at those persons employed on three daily papers. After this the association continued in existence until 1840, when the last minutes appeared in the record-books, but it had an occasional meeting until 1844. Much of its time was occupied with projects to raise the price of labor, to prevent ratting, and to punish those who had ratted; but being very weak in numbers its members could effect little. Circulars were received and sent out by them denouncing certain workmen, and on one occasion the officer who signed the circular was sued for libel. It is not probable that the membership ever exceeded one hundred. One of the members admitted sixty years ago, William Newman, survives and is still at work. He has been a member of No. 6 since its beginning.

The irregular methods of payment, the variation in price, and the fact that store orders were occasionally given to the men caused the establishment of New York Typographical Union No. 6. The number of this union was given by lot a year or two after at a convention of the societies, that of Indianapolis being No. 1. The others following in order were Philadelphia, Cincinnati, Albany, Columbus, New York, Pittsburg and St. Louis, the last of these being No. 8. The New York union was founded in December, 1849, but dates its organization from January 1, 1850. The preliminary meeting was held in Stoneall's tavern in Fulton street, and was presided over by John L. Brown. Twenty-six persons were present, all from the daily papers and from George F. Nesbitt's office. Horace Greeley, who was the last person to come, brought the number up to twenty-seven, and was chosen the first president. At the second meeting twenty-six new members signed the roll. It afterwards increased slowly to a couple of hundred members, and in 1859 numbered 298. These were mostly newspaper men. In that year special meetings held with the object of increasing the membership were productive of results. Among the very active officers in those early days were Charles W. Colburn and Thomas J. Walsh, both now dead. Mr. Greeley was succeeded as president by Franklin J. Ottarson, one of the writers on the Tribune. Since that time more than thirty presidents have been chosen, but it has been found impossible to give a list of them. When the union was organized the Tribune was paying thirty-two cents, but most of the other morning papers only gave thirty cents. After its formation all alike paid thirty-two, and in 1852 rates were raised to thirty-five cents, at which they stood until the beginning of the war. A short strike took place when prices were raised. During the early part of the struggle rates were advanced to forty cents and again to forty-five, but the expenses of living increased more rapidly than the rate of wages. It was accordingly resolved in July, 1864, to advance to sixty cents, which was paid by several of the newspapers, but was resisted by others. This was the highest rate wages ever attained in New York, but it did not buy as much at that time as thirty-five cents did four years before. A general strike followed. Processions paraded the streets, mass-meetings were held, and vigilance committees were formed, but in three weeks the strike was broken and the men went to work again at prices varying from forty-five to fifty cents. The union was nearly destroyed. A compromise was finally effected by which fifty cents was paid, advancing later to fifty-five cents. When the strike occurred in the year mentioned there were no more than four hundred members in the organization, and upon its failure it was sometimes found difficult to get a quorum. The various officers labored earnestly to increase the number, which they finally succeeded in doing. Since that time the membership has continually increased, and now the union has on its rolls between three thousand five hundred and four thousand names of members in good standing. In 1876 a reduction in prices on newspapers was made to fifty cents, followed by another in 1877 to forty-six cents. This stayed the rate until 1887, when it became fifty cents again. In 1876 there was a strike to resist a reduction, which, however, was successful. There was a financial panic in 1873, inflicting great injury upon many occupations, but particularly upon printing. Reductions began then, which continued up to 1877. From that time for three or four years many offices paid their compositors no more than two-thirds of the nominal scale, the union being powerless and the scale suspended. Another strike took place in 1877. In 1879 trade began to revive, and with it printing. In 1883 the men felt strong enough to put the scale into operation again, and active propagandist work succeeded. The membership gained five hundred in a year. A chapel was formed in nearly every office, and in every place where the union felt itself strong enough a card or certificate of membership in that society was demanded from every new-comer. This working-card was introduced shortly after the war, and was an easy method of determining whether an applicant was what he professed to be. In 1887 a demand was made for an increase in prices on bookwork to forty and forty-three cents, according to difficulty, accompanied with a pledge that "in accepting this scale it is understood that this office is to be strictly a card office." This was construed by the Typothetæ to mean that the proprietors would agree to examine the men and find out whether they belonged to the union; if they did not, they would be rejected. The employers demurred to this, and a strike took place, resulting in the abandonment of the objectionable clause. It lasted two weeks and three days, and cost, according to official figures, rather over twenty-seven thousand dollars, or about one thousand eight hundred dollars a day. Seven hundred men went out, three hundred returning, and four hundred men taking the places of those who left. The new prices had been granted, but in 1889 reductions were made here and there all over the city, so that the prevailing rate was far below the letter of the tariff, and in that year representatives of the Typothetæ and the union came together and changed it to thirty-seven, forty and forty-three cents, at which it remains at present. The evening newspaper rate is forty. An office has been kept up by the union for about twenty-five years, where members can pay their dues, and where the unemployed can leave their names. Shortly after this was begun a house of call was opened, this and the office of the union now being on North William street. The principal officers are paid, although very moderately. The families of deceased members receive $150, but there are no other benefits, except in times of strike, when an allowance is made to each man varying from $5 to $7 for single men, and $7 to $9 for married men, when actually out of work. If the strike is large an assessment is made each week upon every employed member. Rather more than one-half of the compositors in the city belong to the union, comprising all of the large book and job offices with one exception, and all of the daily papers except three. About a dozen large offices are free offices, or where both union and non-union men are employed. Most of the small offices pay no attention to the union. Its present officers are John A. Kenney, president; William Ferguson, secretary; and John P. Sullivan, trustee.

There are a number of other unions in the printing trades, there being three among the pressmen, one for the feeders, two in stereotyping and electrotyping, one in bookbinding and one in mailing. The German compositors have a scale of only nine hours, as have the lithographers. The only employers' society besides the Typothetæ is that of the stereotypers and electrotypers, which holds monthly meetings and once a year gives an enjoyable dinner, and that of the photo-engravers, just begun. The lithographers have a national association.

The master printers' society in New York is called the Typothetæ. It began in 1862 in an attempt of the employers to fix upon a new scale of prices to charge their customers. They first came together on December 26, 1862. At their preliminary meetings committees were appointed to take up particular subdivisions of the trade, none being appointed on any committee except such as were familiar with that branch of work. After their labors were concluded the prices agreed upon were published, and there was a dinner at the St. Nicholas Hotel on February 22, 1863, at which John F. Trow presided. Speeches were made by the chairman and by Benson J. Lossing, Peter C. Baker, H. O. Houghton and others. The new association was then and there christened the Typothetæ, and officers were elected. Corydon A. Alvord became president; John W. Oliver, vice-president; Theodore L. De Vinne, secretary; and R. Harmer Smith, treasurer. The times were not propitious for the continuance of this association, and after 1867 it did not meet. After a sleep of a number of years the society was reorganized in 1883, the most active person in this work being Douglas Taylor. The first formal meeting was on November 20. William C. Martin was elected president, and soon afterwards William Charles Rogers became secretary. It was provided that a dinner should take place on every anniversary of Franklin's birthday, and the first of the series was held at the Metropolitan Hotel, Henry Ward Beecher making a fine address. Since that time the dinners have been held either at Delmonico's or at the Brunswick, and among the speakers upon Franklin have been John Bigelow, Carl Schurz and General Ewing. In 1888 it entertained the United Typothetæ of America. Shortly after the society began it opened rooms at 19 Park place, which have since been filled with books and decorated with engravings, oil-paintings and statuary. Many historical relics are also preserved in it. Countless conferences have taken place between it and the workmen since its establishment, and it has once conducted the defensive side of a strike. Much knowledge has been imparted by its members to each other in their familiar intercourse, and it has prevented disputes and hard feelings. There can be no question that prices are upon the whole better maintained than they were before its establishment, and that ruinous competition has very much lessened. The officers of the society from its revival in 1883 have been as follows: Presidents, William C. Martin and Theodore L. De Vinne; vice-presidents, John F. Trow, Theodore L. De Vinne, Douglas Taylor and William Charles Rogers; secretaries, Jesse B. Thomas, William Charles Rogers and E. Parke Coby; corresponding secretaries, William Charles Rogers and E. Parke Coby; recording secretaries, Francis E. Fitch, Peter De Baun and W. W. Pasko; treasurers, Albert B. King, William E. Hallenbeck, John Polhemus and Horace G. Polhemus; chairmen of the executive committee, Douglas Taylor, John Polhemus and R. Harmer Smith. The present executive committee, besides Mr. Smith, comprises James W. Pratt, Henry Bessey, Peter De Baun and Benjamin H. Tyrrel. The late Howard Lockwood was much interested in its work, and was always a delegate from it to the conventions of the United Typothetæ, but declined the cares of office in the local society. An important committee has lately been appointed to celebrate the two hundredth anniversary of the introduction of the art of printing in New York. This committee consists of David Williams, Douglas Taylor, Joseph J. Little, William P. Hamilton, E. Parke Coby, Theodore B. De Vinne and W. W. Pasko. The two hundredth anniversary of Bradford's birth was celebrated in 1863 by Trinity Church and the Historical Society. Many printers were present. Other celebrations in 1893 will be by the Historical Society and the Grolier Club.

New York, London and Paris constitute the three great newspaper centres of the world. As was previously stated, the first newspaper in New York was Bradford's. It began in 1725. Zenger's made its first appearance in 1733. Other journals were established from time to time, none of them being particularly noteworthy. When the Revolution broke out the best newspaper was the Gazetteer, published by James Rivington. He was in a position to obtain good intelligence, and he willingly lent himself to the promulgation of false news to help the British Government. When hostilities were about to commence the publishers, who had taken the patriot side, Holt, Loudon and Anderson, retreated to the country, and there issued their papers, if they could. The tory printers remained, and by an agreement among themselves issued each on a different day. Rivington published the Royal Gazette on Wednesdays and Saturdays; Hugh Gaine the Mercury on Mondays; Robertson, Mills & Hicks the Royal American Gazette on Thursdays, and Lewis the New York Mercury on Fridays. Thus there was practically a daily paper. At the conclusion of the war Rivington and Gaine suspended their newspapers, but remained as general booksellers. Some of the others departed to places within the British dominions, where they might hope for success. The patriots returned. The Journal, issued by Holt, was one of these; Loudon published his Packet, and Kollock removed to New York from New Jersey. The first daily paper was the Daily Advertiser, issued in 1785 by Francis Childs & Co. The Federalist, written by Hamilton, Madison and others, was first published in the Independent Journal, issued by J. & A. McLean in Hanover square. In 1789 there were two daily papers and one semi-weekly, one tri-weekly and one weekly paper. The Commercial Advertiser, the oldest of the daily papers in New York, began in 1793, being then entitled the Minerva. It was edited by Noah Webster, who is down in the Directory as "printer," showing that editor and printer were then synonymous. The title of the paper was afterwards changed to the Commercial Advertiser. The Shipping and Commercial List, a semi-weekly, still existing, is declared by its publishers to have been founded in 1795. It is unquestionably very old. The Evening Post was begun in 1801. It was for many years Federalist, then Democratic, afterwards Republican, and now Mugwump. During all this time it has been conducted with distinguished ability. It is believed that with the exception of these three journals there are none now in New York over seventy years old. In 1810 there were seven and in 1820 eight daily papers. The entire circulation in the former year was 9,170 a day, and in the latter year 10,800 a day. The largest circulation of any one daily was 2,000. The composition on the morning dailies ended early in the evening. The first side had then been worked off. Three pressmen were employed, one to beat, one to pull and the third as fly. Thus manned, two hundred and fifty copies an hour could be printed on a wooden press, and three hundred on an iron one. It was therefore necessary, in order to get the edition off at five in the morning, to begin at ten in the evening on the second side. The staff of the largest dailies consisted of an editor and assistant, one or two men in the counting-room, a foreman and eight compositors, and four pressmen, with a couple of boys. The entire revenue did not exceed forty thousand dollars.

Circumstances began to change just before the establishment of the penny press. The Daily Advertiser, Dwight's newspaper, put in an English cylinder press in 1825 or 1826. Others followed within a year or two. Weekly newspapers began to have a general circulation. The Christian Advocate in 1828 printed ten thousand copies weekly. When the Sun found in 1836 that it could not depend with any certainty upon the man who turned the crank of its press it put in a steam-engine, which enabled it to print for ten or twenty hours at a time if necessary. Reporters then became common. In 1830 no attempt was made at gathering news; in 1840, although ill arranged and giving great space to subjects uninteresting to the general public, the dailies did collect and publish some local information. The prominent man in this change was James Gordon Bennett, and his most valuable reporter was William Attree. A city department with a local editor was begun in 1844 on the Evening Post. In 1847 the New York Tribune, under George G. Foster, organized a similar department. Two or three years previously Henry J. Raymond did the entire reporting on that paper, with the exception of the assistance he was able to get from Mr. Greeley. In 1858 four editors and six reporters could bring out a newspaper of full size. It probably would circulate twenty thousand copies at two cents each, and had on the daily advertising patronage of a little over a hundred thousand dollars a year. Thirty-two compositors, five proof-readers and five weekly hands were needed. Much of the matter was scissored. The telegraphing bill was small, and so was that for contributions and correspondence. There was no stereotyping. Each morning daily paper published several evening editions. In 1861 and 1862 stereotyping was introduced. This rendered it possible for two presses to be employed simultaneously on the same side. Subsequent improvements and the introduction of web presses enabled proprietors to employ half a dozen presses at once at a cost no greater than two had been. Hoe invented in 1847 his lightning press, which was then a great step forward. Before this the New York Sun had been compelled to go to press with its second side at 10 o'clock and continue printing until 10 the next morning. Every newspaper did not demand so rapid a press. The Daily Mirror could have been worked off on a hand-press in 1855, and the New York Tribune was printed on an ordinary cylinder press in 1850. The Bullock press, first used about 1860, allowed the use of a web or endless sheet of paper, and in 1865 it was coming into employment. It was much simpler and less expensive, and did not require so much attendance. Hoe made modifications in this press, and finally stopped manufacturing the lightning press, except for repairs. The new style was more compact, and saved its cost in a couple of years in economy of labor. All morning and nearly all evening daily papers are now stereotyped, and in the larger journals this is many times repeated. Each press is employed only for a short time, but is absolutely required then. The reputed circulation of the newspapers which surpassed the remainder in 1860 was 66,000 and 50,000, the former being issued at one cent. The other dailies between them might have a little exceeded the two together. At present several dailies circulate beyond one hundred thousand, one claiming more than two hundred thousand. Their entire circulation must exceed a million of copies a day. While the weekly and monthly press has not apparently grown with such rapidity, it has been because each periodical has taken a different field. Few pretend to give general news, unless they are issued from the offices of the dailies. The religious, trade and illustrated press is particularly strong. Many of these journals are carried on with distinguished ability. In 1892 there were 43 daily, 5 semi-weekly, 294 weekly, 10 bi-weekly, 36 semi-monthly, 1 issued at intervals of three weeks, 494 monthly, 11 bi-monthly and 21 quarterly publications. The total number was 915. Many of these newspapers were in foreign languages. In 1860 there were 17 daily, 10 semi-weekly, 123 weekly and 50 monthly newspapers, and 82 magazines and reviews, or a total of 282.

The bookselling and publishing trades were at first merely an adjunct of printing. There were no separate publishers until after the Revolution. Those who remained longest were Evert Duyckinck, who was in business for about forty years; Thomas and James Swords, who with members of their family continued from about 1790 until 1865; and David Longworth, the publisher of the Directory, who with his son Thomas published this work from 1795 until 1842. David Longworth also kept the first theatrical bookstore and the first collection of prints. Separate religious publishers began about 1812, and law publishers about 1818. There were no separate medical publishers until much later. Before Harper & Brothers attained much importance the Carvills were the leading house. Isaac Riley did much publishing. The Appletons followed the Harpers, and after a considerable interval Scribner. Dodd & Mead, Randolph, Van Nostrand and others are now in existence. Book publishing does not now employ more firms than it did sixty years ago. This is partly because the people read newspapers instead of books, and partly because much more capital is invested in each house, and its out-turn is greater. There are besides many libraries where books can be consulted without being read. The publication of prints requires considerable capital, and there are several music-publishing houses. Among the books which have been published here and which required great capital may be mentioned Appleton's Cyclopædia in sixteen volumes, McClintock & Strong's Cyclopædia, and the Century Dictionary.

New York State.—This, the most populous State in the American Union, has also more printing-offices and employs more workmen than any other. New York city was the first place in the State in which printing was carried on, the art having been established there in 1693. Albany was the second, a press beginning its work in 1772. During the Revolution those printers who had taken up the popular side were compelled to carry on their business at Fishkill, Esopus and Poughkeepsie. Presses were established very soon after the Revolution at Albany, Sag Harbor, Brooklyn, Saratoga, Watertown, Peekskill, Somers, Goshen, Newburgh, Poughkeepsie, Kingston, Hudson, Catskill, Lansingburgh, Waterford, Troy, Salem, Plattsburgh, Ballston, Schenectady, Johnstown, Herkimer, Utica, Oxford, Cazenovia, Peterboro, Manlius, Batavia, Canandaigua, Geneva, Cooperstown, Otsego, Owego, Schoharie and Sherburne. All of these towns had a newspaper and printing-office in 1810; none except Albany had any in 1784. Twenty-six years had been sufficient to establish fifty-three weekly and semi-weekly journals, each also doing job-work. No one of these places had at that time a population exceeding three thousand, excepting Albany, which had about twelve thousand. Many of them did very respectable bookwork, Cooperstown and Lansingburgh leading in this line. There were no book or job offices independent of newspapers. As representatives of public opinion these journals were much more important than their successors of to-day. The first daily in the interior was at Albany, and the next town having a daily was Rochester. In order of importance from the book and job printer's standpoint the cities which are now the chief ones are Buffalo, Albany, Rochester, Brooklyn, Syracuse, Troy, Utica, Elmira and Poughkeepsie; but in newspapers alone Brooklyn is the chief town. Albany does much legal printing; in Rochester florists' and horticulturists' work is very important; Buffalo covers all fields of printing, and draws orders from a long distance. Utica was once the chief town in which Welsh printing was executed, and also did much music composition. In 1880 newspapers were published in all of the sixty counties, 364 towns each having one journal or more. Among the noted men of the press in the interior have been Joel Munsell, Jesse Buel, Charles Van Benthuysen, Thurlow Weed, Benson J. Lossing, A. M. Platt, Edwin Croswell and William Williams. A press association, combining pleasure and business, has had an existence for about forty years among the publishers. In 1840 there were 245 newspapers; in 1850, 428; in 1860, 542; in 1870, 835; in 1880, 1,411; and in 1892, 1,971. There is only one type-foundry in any place away from New York city, but there are many lithographers, stereotypers and binders. Paper is manufactured largely in this State, and there are besides many manufacturing stationers. Presses are manufactured in several places.

New Zealand.—A British colony in the South Pacific Ocean consisting of three islands. Printing began in New Zealand in 1834. William Colenso, then a young man, was chosen by a British missionary society to go out as a printer and missionary to its station at Paihia, New Zealand, where he was to print the New Testament in the Maori language. He was not half supplied with the necessary tools, but sailed, hoping to get along by ingenuity, and believing that some things would be sent to him. After a voyage of seventeen weeks he reached Sydney, but nine weeks more elapsed before he could sail to New Zealand. An alphabet and grammar had been perfected by one of the missionaries there and composition immediately began. There was no printing-paper, but there was a little writing-paper, with which twenty-five copies of St. Paul's Epistles to the Ephesians and Philippians were printed in octavo, the work being completed on February 17, 1835. Soon after some paper was received from England, when St. Luke's Gospel was printed and bound. On May 19, 1836, the first book in English was issued. It was a report of the New Zealand Temperance Society. Since that time the art has spread rapidly, its introducer being alive three years ago, although over ninety years of age. The principal towns in regard to printing in that country are Wellington, Auckland and Dunedin.

The latest published report shows that in 1887 there were 161 registered newspapers and 135 printing-offices in New Zealand, employing 1,999 males and 108 females. The value of material used was £60,268 and of products £273,886; the capital invested was £331,723, and the horse-power employed was 293.

Newbury Press.—A country newspaper press, made at Coxsackie, N. Y., which was largely used for many years. Hand-power was employed. A small job press was also made by the house, A. & B. Newbury, which manufactured the country press. It had a stationary bed, a tympan and a movable platen, the whole being brought together by pulling over a handle.

Newburyport.—Printing in Newburyport, Mass., began in 1773, Isaiah Thomas being the first printer. He had as a partner Henry Walter Tinges. Ezra Lunt afterwards became the associate of Tinges, and subsequently both were succeeded by John Mycall, who had not been bred to printing, but was a man of great ingenuity. He carried on the business from about 1776 till 1796, when he retired. He died in 1826. There are now three daily and two weekly papers published there.

Newport.—James Franklin removed to Newport, R. I., when the New England Courant was discontinued in 1732, and died there in 1735. He was succeeded by his widow, Anne Franklin. The daughters were instructed in the art, and became swift and correct compositors. As soon as Mrs. Franklin's son James was of age he became the partner of his mother, and conducted their concerns in his own name. He died on August 22, 1762. His mother, partly alone and partly with Samuel Hall, carried on business until her death soon after in 1763. Solomon Southwick succeeded Hall. In 1787 he placed his journal, the Mercury, in other hands. He died in 1797. It was his son who was prominent in Albany twenty and thirty years later. Two daily and two weekly papers and a monthly are published there.

News.—In the sense of newspaper editors the event which is of interest at present to their readers and has not previously been published. Different newspapers have different constituencies to appeal to, and that may be news to one which does not excite the slightest curiosity in the other. A trial for heresy is of no interest to the readers of a sporting paper, and hence however full an abstract such a periodical might publish its readers would avoid its perusal. If the report were continued the journal would be injured, for its patrons would cease to take it. The finding of a new group of asteroids would be news in an astronomical paper, but not to a metallurgical journal, and the discovery of a hitherto undescribed reef outside of New York harbor would interest the Shipping List and the Herald, but not the School Journal or the Barbers' Review. Special or class journals have less news, properly so called, than general newspapers. The latter collect every day all that they think will interest the people, and ignore that which they believe will not. Thus we find that the most prominent daily journals of New York and Chicago devote one-third of their available reading matter to crimes, accidents, trials and quarrels. Speaking philosophically, it is of no particular consequence whether a German peddler in New York kills or does not kill a man from his own country. He and his victim are both unknown and undistinguished, and deaths of obscure Germans happen in a great city at the rate of hundreds in a week. But the public is interested in a murder because it is a manifestation of extreme anger, malice or cupidity; it demands the particulars, and no general newspaper would be wise which did not more or less satisfy this desire. This is news in New York, and it is also news at Albany, Newark or Scranton, because their inhabitants are to some extent familiar with New York and they are accustomed to read its local news with considerable fullness. In St. Louis or Chicago it is by no means an important bit of news. It is a long way off, and there are crimes in those two cities or their neighborhoods which claim their attention more strongly. That news is most valuable which relates to subjects near by. If an elephant broke loose from a procession in a certain locality and ravaged the neighborhood every man, woman and child there would desire to see a copy of the daily newspaper which described such an occurrence fully. This interest would fade and die out according to the remoteness of other localities from the scene of action, where, although it would be worth a special dispatch, probably very few people would on this account buy a copy of a journal which contained a full report of the matter. A brief summary would be telegraphed over the whole of the United States.

No matter is news which has previously been published in such a way that it is likely to have reached the constituency of a journal. The comic story of an editor in a mining town who heard in a church the narrative of Noah and the Flood, and wanted his assistant to make a big spread upon it, getting all the particulars, has in it an element of truth. This would be most prodigious news had we not been familiar with it all our lives. When an event has grown old or has been related it is no longer news. The French and Prussian war ended many years ago. It would be impossible to interest the public in a narration of its general facts; but the falsification of what was sent from Ems at that time was not known before 1892, and it was therefore news when Bismarck confessed that he had doctored certain dispatches. Hence, in a general sense, news must interest mankind at large; it must be recent, and it must be near. What happened yesterday in a mining camp in Colorado is more important to the inhabitants there and has greater interest to them as news than the Thirty Years' War or the battle at Thermopylæ. The editor, therefore, who is wise in a worldly sense does not permit the background to be seen. He reports in full everything which he thinks his patrons care about, and says nothing about much greater and nobler things which he does not believe they are interested in. The faculty of knowing what is news is very valuable to an editor, as well as the ability to see where news is likely to be found. He aims to have men accompany the advance of armies, as they will thus be able to describe the shock of battle, and he places them in courts, at police headquarters, at the coroner's, in financial centres and at the exchanges. Thus little happens without his knowledge. In newspaper language, to have news which a contemporary does not secure or has very imperfectly is a "beat;" if the subject is important and the editor's account is full, while the others have nothing, it is a "scoop."

Four years ago an estimate was made as to the cost of the news published in the various journals of the United States. That which is sent as general press dispatches costs $1,820,000; special press dispatches cost $2,250,000; and local news costs $12,500,000. This includes both the pay of the special correspondents and the toll in telegraphy. The average bill each month on the Chicago Herald was $6,500; on the Philadelphia Press, $3,600; on the New York World, $9,514; and on the St. Louis Globe-Democrat, $11,660. The weekly bills of a New York daily paper for local news range from $1,500 to $3,400. It is supposed that about thirty-five thousand persons are engaged in gathering news or in commenting upon it.

News Agent.—One who sells newspapers at a stand or in a shop or store. His calling is very much like that of the newsboy, except that the business is stationary and customers come to the agent. In the large cities news agents are supplied in several ways. A local news agent obtains the various journals from their delivery-rooms, and supplies by wagon a certain number of customers. The newspapers themselves send out wagons to deliver their own journals, and the great news companies do the same thing. Many small dealers also visit the newspaper region and get their own papers. If the number of papers is large it requires considerable strength to get them home, as they are very heavy. Some news agents do a very large business. There are shops where several thousand journals are sold in a day, and there are other news agents or dealers in newspapers, magazines, &c., who do a large distributing business as jobbers, if this term may be so applied.

News Chases.—Chases made to fit single pages or two pages of a newspaper worked together. They differ from book chases in being narrow on one or two sides and in having no shifting bars.

News Companies.—Corporations formed for vending newspapers, periodicals and other merchandise. The largest of these is the American News Company, with its principal office in New York, formed by consolidation of several smaller companies. Of many newspapers it takes half the edition, and of others nearly all. It is a bookseller and stationer as well, and its sales are said to fall below only one or two houses in the dry-goods interest in that city, and to exceed those of any grocery or hardware establishment there. Newspapers are sold on only one week's credit. Similar but smaller establishments are found throughout the United States in all of the largest cities. A retail bookseller, stationer or news dealer can buy his entire supplies of one of these companies, as they furnish everything.

News Composing-Stick.—A tool often made of mahogany lined with brass for the sake of lightness, and made up to a fixed measure.—*Jacobi.* Such a stick is unknown on American newspaper work, in which only metal is employed. Wooden sticks are used on long measures in job-work.

News House.—Printing-offices for that class of work—distinct from houses which lay themselves out for bookwork and jobbing.—*Jacobi.* If this were turned into the talk of the trade on this side of the water it would be said they are printing-offices where the composition of newspapers is executed.

News Quoins.—The larger kind of wooden quoins are thus termed, those used for bookwork being of a smaller average.—*Jacobi.* This distinction does not prevail in America.

Newsboy or **Newsgirl.**—A boy or girl who sells newspapers in the street or in places of public resort. They usually buy a paper which sells for a cent at half a cent, and on the higher-priced journals they get from one-quarter to one-third of the published price. Many of them are friendless children, and occasionally one will be seen no more than six years old. This calling is very demoralizing to girls. In New York and Brooklyn philanthropic gentlemen have established newsboys' homes, where lodging can be obtained for a few cents, and where they are otherwise cared for.

Newsman.—A news agent, but occasionally the same as a newsboy grown large; a newspaper carrier.

Newspaper Chases.—Specially made chases to allow of the pages being laid closely together on the machine.—*Jacobi.*

Newspaper Slip Galley.—The English name for the common American galley, with bottom, end and two sides wholly or partly of metal. See GALLEY.

Newspapers.—Printed sheets published at stated intervals, chiefly for the purpose of conveying intelligence on current events. The Romans wrote out an account of the most memorable occurrences of the day, which were sent to public officials. They were entitled Acta Diurna, and read substantially like the local column of a country weekly paper of to-day. Before the invention of printing letters were written regularly by persons in the chief capitals of Europe and dispatched to those who felt an interest in public affairs. For this the correspondents were paid. The earliest English journal in print was the Weekly Newes from Italy, Germanie, &c., in 1622, a prior newspaper preserved in the British Museum which contained an account of the Spanish Armada being regarded as a forgery. The first attempt at reporting Parliament was made in 1641, and the first advertisement was inserted in 1648. The first daily newspaper in England was the Daily Courant, in 1702. The London Times was founded in 1788. Long before this the Spectator, the Rambler and other journals had appeared, and a considerable number of special periodicals had been printed. The Mercure François, beginning in 1605, was the earliest French newspaper. The earliest German newspaper, the Frankfürter Oberpostamts-Zeitung, is still in existence. It began in 1616. In Russia newspapers originated in 1703, and in Holland in 1605. European newspapers are of three types. Those of France, Spain and Italy give comparatively little news, but much criticism and original light literature. In Great Britain and its colonies the columns of a journal are devoted to reporting in a colorless way, but very fully, the affairs of the day, and they contain elaborate editorials upon public affairs. Private matters secure very little attention except when they come into court. Their correspondence and editorial writing is generally executed by men of high education and wide information. In Germany correspondence and restatements of public matters are the best points. In most German newspapers there is little reading except of the dryest kind. The chief centres of the press in Europe are in London, Paris, Berlin and Vienna, although the last two are far inferior to the others. In Paris daily newspapers attain their highest circulation, passing in one instance considerably beyond half a million. London, however, spends more money on her journals than the other three capitals together, and by dint of perfect organization, lavish expenditure and excellent facilities in distribution is able to publish newspapers of the greatest value.

In America the first journal appeared in Boston. It was issued on September 25, 1690, and contained such reading matter that its further continuance was forbidden by the General Court. The next was also in Boston, being the News-Letter. It was issued on April 24, 1704, and lasted until 1776. The Boston Gazette was issued on December 21, 1719, and the Philadelphia Weekly Mercury was started the next day. On November 16, 1725, the Gazette was begun in New York. In 1754 there were four newspapers published in Boston, two in New York, two in Philadelphia and one in Williamsburg, Va. In 1776 there were thirty-seven in all of the colonies. The early American newspapers were very small, and rarely published home news, the principal portion of their space being given up to extracts from foreign newspapers. There was no local matter, except by accident. Circulations were small, and the publisher, who was always the printer, was obliged to eke out a living by keeping a miscellaneous shop and by attending to all sorts of commissions. The first daily paper was the Philadelphia Daily Advertiser, which began in 1784. New York issued a daily paper the next year, but Boston did not have one until 1796. The total number of newspapers published in the United States was, in 1800, 200; 1810, 359; 1828, 852; 1830, 1,000; 1840, 1,631; 1850, 2,800; 1860, 4,051; 1870, 5,871; 1880, 11,314; and 1890, 16,948. All of the Atlantic seaboard States had newspapers in 1810, and in the Western States at that time Kentucky had 13, Ohio 14, Tennessee 6, Indiana and Michigan each 1. The earliest newspapers beyond the Alleghanies were in Pittsburg in 1786, and in Lexington, Ky., in 1787. The earliest daily paper away from tide-water was in Rochester, N. Y., in 1826. Newspapers were published on the Pacific coast, at San Francisco, as soon as that city came under the control of the Americans. Of late every town has one or more newspapers, and there is scarcely a village so small that one has not been attempted.

The advancement of newspapers in the United States has followed that of the development of roads, railways and steamboats. A New York newspaper can now be read in Chicago within twenty-five hours of its issue. Fifteen years ago it would have taken thirty-six hours, and thirty years ago forty-eight hours. In the early part of the century it would have taken a man traveling express a month to carry it to Chicago. This improvement in transit has rendered it possible to send newspapers in all directions to great distances. Paper has lessened in cost. In 1810 the exertions of two pressmen, worth between them two dollars and a half for a day's work, were requisite to print twelve hundred sheets on both sides. Now on the ordinary cylinder press it takes one man half an hour, as he prints equal to four of the former sheets at once. Every other facility has been increased. The first great change was about 1817, when iron presses took twice as large a sheet as before. In 1825 power-presses multiplied their speed by four, and in 1847 this was again quadrupled by the lightning press. The steamboat in 1807 made a great improvement in communication between places which were lying upon the water, giving them far better facilities, and about 1830 railroads were put into operation. Thus when the first attempts were made to publish cheap daily newspapers they proved successful. The cities had grown large enough to require many copies themselves, and inland places also bought largely. The Sun in New York was the first successful penny daily. It was speedily followed by others like the Philadelphia Ledger. The principle of selling the journal to the carrier or newsboy was a great step in advance, and that of demanding prompt pay for advertising was another. Successive improvements, detailed elsewhere, have much strengthened the newspaper press. The use of the telegraph has equalized all places of like size, and new methods applied to the collection of news have so increased the interest felt that cities of one hundred thousand inhabitants now demand more copies of newspapers than those of half a million did thirty or thirty-five years ago.

Newspapers call for the largest proportion of printing in the United States. There is no town in which printing is done in which a newspaper is not published, and in most instances the work upon them takes the larger share of the business. The revenues of the newspaper printing-houses far exceed those of book and job offices, and the profits on similar investments are larger. It is usual to divide newspapers into two classes, general and special. Many are devoted to specialties, as law, trade, agriculture, or religion. Some are collections of miscellany and novels, while others are devoted to subjects in which the world takes very little interest. They are further divided as to frequency of issue. The daily press is more powerful than the weekly, as it repeats its arguments and its comments day after day, and its news is given when it is fresh and the greatest interest is felt in it. There are besides tri-weeklies, semi-weeklies, bi-weeklies, semi-monthlies, monthlies, bi-monthlies, quarterlies and annuals. The last four are generally known as periodicals, a term which really applies to all journals. Efforts have been made to establish newspapers which shall appear twice a day, but without success, although morning and evening editions are frequent, and it is not uncommon to see a morning and an evening paper issued from the same office, taking substantially the same view of public questions. An early edition of an evening newspaper has been tried, the journal covering all of the ground from midnight until 7 or 8 o'clock in the morning, and late editions of evening papers have also been published containing sporting news.

Daily newspapers are issued either in the morning or evening. The latter, when only one edition is put forth, issue at about 3 o'clock; but when the city is of considerable size its earliest edition will appear at about 1 o'clock, a second will be published at about 2:30, and a third at about 4 o'clock. Frequently more editions than three are demanded. Every page is not made up again, only two or three needing attention on an eight-page paper, and on a four-page paper perhaps only one. The editors are usually at work at 8 o'clock, and they and the reporters labor until about the time of going to press. In New York and some other cities no effort is made to collect for the next day any independent news of what happens after the paper is ready, or to publish anything then unreported, but morning newspapers give the news for the twenty-four hours. In smaller cities the practice on both morning and evening journals is alike; everything which is interesting and previously unnarrated in a certain journal is inserted, no matter when it happened. When the journal is weak pecuniarily much of the matter is extracted from other newspapers, sometimes being written over, but more commonly borrowed, with or without acknowledgment. All the daily newspapers devote very much space and attention to their local news. In the smallest towns this is absolutely necessary, if the paper is to succeed. In such towns a column of brevier copy can be obtained for each five thousand inhabitants, this news being on a scale of such minuteness as to interest some persons in every street or neighborhood. If the journal in a city of a hundred thousand inhabitants were to imitate this example it would have too much local copy, although much more important events occur there. Telegraphic news is obtained from one of the news associations, the Associated Press or the United Press, which charge in different parts of the country from twenty dollars a week upwards. If the newspaper cannot afford this expenditure the American Press Association will furnish a summary of the news of the day and any miscellany which may be desired. The shape is that of stereotype plates, so that no composition is required. Telegraph copy is without any perspective. The most trifling and the most important matter is sent, and the custom of most editors is to publish all, instead of editing what is received and throwing away that which is worthless. Morning newspapers have more time to prepare their copy and to set it up than the evening papers, and generally they are richer. They buy far more copy, and they have more special telegraphic dispatches and more correspondence.

Tri-weeklies and semi-weeklies are not now so common as in former years. As a rule they are made up from daily newspapers. Many country dailies have all of their reading matter on two pages alongside of each other. By holding these two pages over from one day until the next, and then allowing the reading matter of Tuesday to back that of Monday, a tri-weekly is produced with a minimum of labor. Sometimes even the dates are not changed, and the paper has the same head inside and outside. Semi-weeklies are got up with a little greater care, but not much more. They are taken from three days' issue. Several long-established semi-weeklies have died within the last decade, as there was no longer any demand for them.

Weekly newspapers are more important than any other kind except dailies. They are continually multiplying, largely because readers like special journals, conveying particular news or ideas, and largely because they are published conveniently for the readers. Most post-offices in the United States are not so situated that their daily mails can be distributed as received. A visit once or twice a week to a post-office is all for which most farmers can find time, and in many cases two or three weeks elapse between calls. By agreement with neighbors, each taking turns in going to the post-office, papers and letters can be obtained more frequently. The local newspapers are in large type; they contain the local news and a sufficient summary of other matter, with a proportion of miscellany. They thus become very important factors in country life. See WEEKLY NEWSPAPERS.

Bi-weekly and semi-monthly newspapers are usually issued in cities, and do not contain general news. They are published at such intervals because their circle of readers is small, or because there is not enough pecuniary return to justify a more frequent issue. Occasionally, also, they are controlled by the fact that the mails are available only at these times.

Monthly periodicals are treated to some extent under MAGAZINE, but some real newspapers are published at intervals as long as this. Bi-monthlies and quarterlies are really magazines, except when intended to be given away, and annuals and semi-annuals are books to all intents and purposes.

The subdivisions of newspapers as to subject are very numerous. Trade journals in the United States date from 1830, when the Railroad Journal was established. It is still published. Religious newspapers were begun near the beginning of the century, and agricultural journals at about the same time. Excellent papers are now published concerning agriculture, horticulture, finance, banking, printing, education, religion, secret societies, advertising, art, the army and navy, books, mechanical trades, children, commerce, cooking, fashions, science, insurance, labor unions, machinery, music, sports, medicines, law, temperance, real estate, paper, stationery, lumber, history and biography. The total number of classes would be two or three hundred.

Another development has been that of papers in foreign languages. Bradford and his contemporaries and the Boston printers issued books in Dutch, German and French, but it was not until after the Revolution that journals in foreign languages were issued, with the exception of German. The greater number of these periodicals are now in German. In Pennsylvania there are many American families in which German is spoken more easily than English, although their ancestors came here a hundred and fifty years ago, and there has been a large immigration of Germans for the last fifty years. There are now about five hundred German newspapers in the United States. After these come Danish, Swedish, Italian, Spanish, Portuguese, Hebrew, Chinese, Dutch, Bohemian, Polish, Hungarian, Welsh and Armenian. Many other languages are spoken within the limits of the United States, but there are not enough of one nation in any one place to support a newspaper. These languages die out slowly. The Germans began to come to this country in numbers in 1710. For eighty years after 1765 there was little immigration. Yet the German-speaking population steadily increased. Welsh became common in the vicinity of Utica in 1820, and to this day in some neighborhoods that language is as important as English. The number of Dutch families which settled New York colony did not, it is thought, exceed three thousand. There are, however, probably more than three thousand families in the State in which Dutch is understood, and it will take another century for this language to die out. It never had many schools; little printing was executed in it, and preaching in Dutch ceased, as a rule, more than half a century ago.

The various persons engaged in the production and publication of newspapers are publishers, deliverers, mailing-hands, carriers, newsboys, pressmen, engineers, feeders, compositors, proof-readers, draughtsmen, stereotypers, editors, reporters, correspondents and advertising men. Besides these are the usual clerks and porters. No daily paper could be published in New York or Chicago employing less than a hundred persons; in many there will be three or four hundred, and it may possibly reach in some cases to nearly one thousand. Among those charged with peculiar and responsible duties is the person who reads or examines all of the copy to prevent duplication. The city editor keeps a diary of events to come, so that he can make preparation for reporting them as the time draws nigh, and there should be another person whose duty it is to watch with close attention general events in the same way.

On one daily newspaper there are three indexers, who index every event of any importance under its subject with cross references, not only in that journal, but in its important contemporaries. Thus, whatever happens, a reference to the same subject is almost certainly forthcoming. Still another is an obituary writer, who receives all of the clippings relating to living persons, and puts them away awaiting the time when death shall demand that the extracts shall be brought forth again. Many have already been written. Should any public man die half an hour before a great journal goes to press the account of his life is handed to the printer, and it will appear the next morning.

The compensation of writers on newspapers follows no general rule. In New York city, where the highest prices are paid, the editor-in-chief will receive from five thousand dollars a year up to fifteen thousand. One obtains more than twice the larger sum. Managing editors receive from three thousand dollars up to twelve thousand, and writers of leaders from two thousand to six thousand. City editors have from forty to eighty dollars a week; excellent reporters on first-class daily papers are paid from forty to sixty dollars; good reporters from thirty to forty on the same journals, or from twenty-five to thirty on papers of lower standing; and miscellaneous reporters and writers on daily and weekly journals get from twenty to thirty dollars. Minor editorial positions are worth about thirty dollars. On weekly papers prices are less. An editor may receive fifty dollars a week, but on many he will obtain no more than thirty-five. On small newspapers the editors will receive less, and the minor writers from fifteen to twenty. Much copy is written on the daily and large weekly journals by SPACE, which see. A foreman of a large daily paper will receive fifty dollars a week, but on a smaller one not more than thirty-five. The publisher is paid from three to fifteen thousand dollars a year, the latter figure being exceptionally high.

The chief centres of newspapers in this country are the great cities, but they do not follow the order of size. Brooklyn, the fourth city in magnitude, has fewer dailies and fewer weeklies than many towns no more than a sixth or seventh of its magnitude. The reason is plain. It is overshadowed by its neighbor across the river. Many Brooklyn people never see a Brooklyn newspaper, although they are constantly buying one published in New York, where, of course, more newspapers are issued than in any other city, Philadelphia and Chicago coming next on about an equality. After these come Boston, St. Louis and Cincinnati. Baltimore and New Orleans are both far behind; but San Francisco rather surpasses the last. St. Paul and Minneapolis, considered by their daily press, are very high up in the ranks. Some of the small cities publish many more newspapers in proportion to their population than the larger, and these are frequently very good. Springfield, Mass., and Augusta, Me., may be given as examples. The order in which American cities stood in 1880 in regard to daily circulation was New York, Philadelphia, Boston, Chicago, San Francisco, Baltimore, Cincinnati, Pittsburg, St. Louis, Cleveland, Brooklyn, Detroit, New Orleans, Indianapolis, Washington, Albany and Providence. The official returns for 1890 have not yet come to hand, but the relative standing has no doubt been much altered. In Pittsburg five papers were taken by seven persons, and in New York and San Francisco five papers by eight persons. In Jersey City there was only one newspaper to eleven inhabitants, and in Brooklyn only one to twelve. The explanation of this is that Pittsburg and San Francisco have no competitors in their own region, while New York journals circulate throughout the whole country. Jersey City and Brooklyn are swallowed up by New York, which is the centre of all news.

A daily paper is not generally issued in towns having less than fifteen thousand inhabitants. Two weekly newspapers are published at nearly every county seat, and one in other villages having a thousand population. When the village reaches three thousand population it has two weeklies, and when it has five thousand population there are three. The number does not often exceed four or five until a daily paper is begun. A city with twenty thousand population will have two dailies, with forty thousand three, with sixty thousand four, and when it passes one hundred thousand there may be five. After this point one is added to each fifty thousand until about ten are published. The largest number of dailies in any one city in 1880 was 29, which was in New York. Philadelphia had 24; San Francisco, 21; Chicago, 18; Cincinnati, 12; Boston, 11; and New Orleans, 10. Brooklyn had only 5 and Louisville 5. In New York there are now 41.

A very large proportion of the newspapers are now sold by news agents, who receive as their own from one-quarter to one-half of the whole of the price named by the publisher. In the cities where news agents do not purchase largely the carriers must be paid for their services and collectors must be employed. The receipts for advertising on daily papers constitute about one-half of the total income, but on weeklies and all others 39 per cent. The receipts of the daily press in 1880 were estimated by Mr. North at $43,702,113, and of other periodicals at $45,306,961, a total of $89,009,074. It would be safe to estimate that the increase for the last twelve years has not been less than 70 per cent., when we consider the prodigious growth of the newspapers in the great cities, the diminution of the price of paper and ink, and the assiduous cultivation of the art of gathering advertisements. This is about the rate for the preceding decade, and would bring up the total for to-day to $151,315,425.

Newspapers, as a rule, are not very long lived. Only one or two of those which started before the Revolution are still in existence, and the number which have maintained their footing for half a century is small, even when the identity of a present paper with a former one of the same name is considered. In many cases there are gaps of five or ten years. In New York only one newspaper is a hundred years old, and two have attained the age of ninety. A list of the deaths of daily newspapers in New York since 1830 would considerably exceed two hundred. Each represents hopes and aspirations, hard work and money. The suspended newspaper publications in 1892 in the whole country, according to Rowell's Newspaper Directory, were 1,826, and the new journals begun were 2,721. Many end competition and existence by consolidation with other periodicals.

A very large proportion of American newspapers are issued on what is popularly known as the patent inside or outside plan. By this method only a part of the matter is set by the journal itself, as it purchases the sheet partly printed. The price to the customer is only so much a quire, and for three to six dollars he will obtain paper sufficient for the whole edition of an ordinary country weekly, with as much printing upon it as would cost him from twenty to fifty dollars for composition. As a rule, the part executed before it reaches the country printer is better than the remainder, and the reading matter is also better. In the central office three or four hundred thousand ems are set up each week, and selections from this quantity of matter are printed in two or three hundred newspapers. Thus the cost of typesetting is reduced to a minimum; paper is bought in large quantities, and presswork is executed under favorable circumstances. There is of course some delay in changing from one newspaper to the other, but practice has shown many methods of saving time. These central offices generally reserve a certain proportion of space for advertising which they insert, and much of the energies of their managers are taken up in efforts to gather such notices. There are perhaps twenty co-operative offices of this kind in the United States, most of them belonging to one of two combinations. See PARTLY PRINTED NEWSPAPERS.

An analysis of the statistics given in 1890 by George P. Rowell shows that the weekly papers represent 75 per cent. of all the newspapers and periodicals in the country, the monthlies about 12¼ per cent., and the dailies 9½ per cent. The remaining 3 per cent. is divided among the semi-monthlies, semi-weeklies, quarterlies, bi-weeklies, bi-monthlies and tri-weeklies, their frequency being in the order given. The United States and the British Provinces issue newspapers in the order as given below, only the first four publishing as many as a thousand each, the next ten beyond five hundred each, the next ten beyond two hundred, the next fifteen beyond a hundred, and the last six below one hundred. Nevada was the smallest, with 24, and New York was the largest, with

1,778. The Territories together stand halfway and publish 290. The list is as follows: New York, Illinois, Pennsylvania, Ohio, Dominion of Canada, Kansas, Iowa, Missouri, Massachusetts, Indiana, Michigan, Nebraska, California, Wisconsin, Texas, Minnesota, New Jersey, Colorado, Georgia, Kentucky, South Dakota, Tennessee, the Territories, Virginia, North Carolina, Arkansas, Connecticut, Maryland, Alabama, Maine, Mississippi, Louisiana, Washington, West Virginia, Oregon, New Hampshire, Florida, South Carolina, North Dakota, Vermont, District of Columbia, Rhode Island, Montana, Delaware and Nevada. Of these 5,426 publications issued 500 copies each; 3,341, 250 or less; 2,351, 750; 2,016, 1,000; 1,181, 1,500; 612, 2,000; 503, 2,500; 506, 3,000; 432, 4,000; and 364, 5,000. Three hundred and eighty-three circulated between 7,500 and 10,000. Those going beyond this were 615. The highest number classified was 150,000, although there is no doubt that six or eight periodicals surpass this figure. One-fourth of all American readers may be addressed through 132 publications. New York prints more than one-quarter of all the periodicals which are sold, and Pennsylvania, Illinois and Massachusetts print more than another quarter.

The amount of type set on each newspaper of the daily press in 1880 averaged 74,147 ems, which it is probable has since been exceeded by at least ten thousand. The entire quantity then set by all of the daily press of the United States was 66,140,266 ems. If we take this to average minion at eleven ems to the inch the quantity would make a line ninety-five miles long each day, advancing during the hours of composition at the rate of nearly ten miles an hour. It was estimated that there was in use on these newspapers 6,689,878 pounds of type. It is impossible to estimate the capital employed, as most journals have been started by men without means, and the growth in the way of sales and advertising did not require as great a corresponding increase in plant or in ready cash for expenses. On weekly newspapers which are paying expenses it is considered that capital enough for the outgoes of three months is sufficient, and most projectors of daily newspapers believe that a year's expenses will equal the amount of capital required to put an enterprise of that kind on a paying basis. Thus for a journal published at an expense of $500 a day $150,000 would be required. Part would be sunk in each of the first three years, but in the fourth year the paper would make a moderate profit. In ten years it might clear $30,000 or $40,000 a year. If there was little competition, or the competition was so weak that it could be disregarded, less time and money would be sufficient. In the weekly the rule above given would require that one costing $100 a week should have on hand $1,300 capital to begin with in addition to its type. There are twenty daily papers in the United States which are estimated to be worth over $1,000,000 each, and two or three are said to be valued at $2,000,000 each. This valuation would not be far from their gross receipts each year. The common estimate on valuation is five years' net profits; but few publishers would sell for this.

There are no very recent statistics relating to the press of the whole world. The latest known to the writer are those given by H. P. Hubbard of New Haven, in 1881. There were then supposed to be from 32,000 to 35,000 newspapers in existence, 11,000 or 12,000 being in the United States. There are now in the United States and the British Provinces about 20,000 newspapers, and probably the remainder of the world will afford from 25,000 to 28,000. In 1881 Germany had 5,529 newspapers, England 3,460, France 3,265, Austria-Hungary 1,802, Italy 1,174, Spain 750, British America 624, Belgium 591, Switzerland 512, Russia 454, the Netherlands 435, Australia 451, British India 373, Sweden 303, and Mexico 283. The largest circulations were in the United States, England, Germany and France. In no other country did the newspaper circulation equal one-quarter of that of the French journals. There were forty-nine countries in all.

With the greater number of newspapers the largest expense is composition, but those with large circulation find that paper is the greatest item of cost, and editorial expenses, including telegraphing, come second. Taking the outgoes of the New York Tribune for two years and the New York Sun for one year, the following analysis is reached: Tribune, 1865—Paper, 51 per cent.; composition, 12 per cent.; editorial expenses, 19 per cent.; pressroom, 6 per cent.; mailing, 6 per cent.; publishing office, salaries, 3 per cent.; ink, 1 per cent.; advertising, 1 per cent.; postage, 1 per cent.; United States tax on advertising, 1 per cent.; gaslight, 1 per cent.

Tribune, 1866—Paper, 48; composition, 10; editorial expenses, 22; pressroom, 5; mailing, 4; publishing-office, salaries, 3; ink, 1; advertising, 2; postage, 1; United States tax on advertising, 1; gaslight, 1.

Sun, 1876—Paper, 45 per cent.; composition, 10; editorial expenses, 24; pressroom, 7; mailing, 1; publishing office, salaries, 3; ink, 1; postage, 2; gaslight, 1.

The glue and molasses for rollers cost one-tenth as much as the ink. That varied from 22 to 24 per cent. of the other pressroom expenses, and was about a fortieth of the amount spent on paper. The total expenses of the Tribune in the first year given were $646,107.86; in the second $885,158.39; and for the Sun, supposing the week published was the just average of a year, they were $824,752.43.

The quantity of white paper consumed upon a leading newspaper is now twice as great as at the times when the Tribune and Sun made their statements. The amount used by the Boston Herald in a recent year was worth $315,000; by the Boston Globe, $326,000; by the Chicago News, $324,000; and by the New York World, $667,500. One newspaper in Atlanta, Ga., the Constitution, needed $63,000 worth of paper, and the Journal of Kansas City required $53,000. The weekly composition bills of several journals, as stated, were for the Philadelphia Ledger, $2,150; the New York Times, $3,000; the New York Herald, $3,780; the Boston Globe, $4,100; and the New York World, $6,000.

Nichols, John, a printer and antiquary of the last century in England, was born at Merrie Islington, in that country, on February 2, 1744–5, and became apprenticed to William Bowyer, the distinguished printer, in 1757. When he was bound Nichols's father received from Mr. Bowyer an agreement to return half of the apprenticeship fee at the expiration of seven years, provided the boy behaved as was expected of him. This sum was honorably paid to him in February, 1766. In that year he was taken into partnership which did not terminate until the death of Bowyer in 1777. The printing business was large and lucrative. In 1778 Nichols began a connection with the Gentleman's Magazine, subsequently becoming publisher, editor and printer. He followed this with several antiquarian works of great ability, including his Britannica. A Biographical Life of William Hogarth went through four editions. His Memoirs of William Ged throw much light upon the subject of the first English stereotyper. In 1782 he published Anecdotes of Bowyer and Many of his Literary Friends, which has remained ever since a mine of literary and social information concerning the eighteenth century. Besides these he edited or wrote many other books, the total number of his works being sixty-seven. He was a member of the Common Council of London from 1784 until 1811, with the exception of one year. In 1804 he was elected Master of the Stationers' Company, and during his term of office presented that body with a number of oil portraits. His thigh was fractured in 1807, and not long after his printing-offices and warehouses were destroyed by fire. He bore up well under this calamity, and died on November 26, 1826.

Nicholson, William, a scientific man of England, who on April 29, 1790, obtained a patent for a machine or instrument for printing on paper or cloth, embracing the first suggestion for machine presses. One of the primary ideas of this patent was printing by cylinders, either ordinary or rotary. The patent is a remarkable instance of thought and ingenuity, and although no machine was ever constructed by Nicholson it is unquestionable that it gave much impulse to the ideas of succeeding inventors. It was claimed by Blades that it was not until König saw Nicholson's plans that he really developed anything of value. Nicholson was the author of a Dictionary of Chemistry, and published Nicholson's Journal of Science.

Nick.—A hollow cut or cast in a type on the front for the compositor to see and to feel when picking it up. It also serves to distinguish one font from another. Bodies which are nearly alike should have dissimilar nicks. These are from one to five, and are grouped together or spread out in a manner best calculated to accomplish this object. Two nicks at the bottom and one high up are very different from one nick at the bottom and two high up. Type-casting machines nearly all require peculiar nicks to distinguish one letter from another, so that they can be mechanically separated when distributing; and most have placed them upon the back, to the discomfort of the hand-compositor when he is compelled to use the same letters. The McMillan machine, however, has them upon the front, and dispenses with the font nick. In France all type is nicked upon the back. The first type-founders do not appear to have known about a nick, as type fished out of the river Saône, near Lyons, a few years ago, and which must have been made in the fifteenth century, had none, and there are no marks of a nick in type crushed on the face of forms printed at about the same time. Foot-nicks are known, but only in connection with typesetting machinery. The hollow at the bottom of every type is where the jet has been broken off and the projection smoothed away.

Nickel Face.—Electrotypes are often nickel-faced when they are to be used with colored inks, as copper injures the color. Nickel-facing is also employed to give increased durability to the plates. It is said to accomplish this object admirably. Some printers have all their finest job fonts nickeled, and claim that it is better than copper.

Night Work.—Labor at night. It is less efficient and costs more than day work, as it is more exhausting to the workman, and he is occasionally compelled to lose time during the day on this account. It does not seem that really efficient work can be done by the piece by most men for a greater number of hours than ten, and each hour added is in turn less productive than that preceding. For this reason no sensible employer likes to do night work. The added price which he receives does not compensate for the demoralization of his force. It should not be forgotten that the production of a day after working a considerable part of the night is less than that in a day preceding when the men have had a night's rest. Employers should charge their customers at least one-half more for all night work than for ordinary work, and where the local scale demands one-half more for the workmen the employer should receive twice his price for day work. If the work is to be for only one night men can be kept up until 12 o'clock; if for two or three nights, no later than 11; and if for a week or more not later than 10 o'clock. If for any reason the hands are required to stay up until 3 or 4 in the morning they should be allowed to come down later than the usual opening time, and an extra allowance should be given them in money, as well as some provision for a supper about 11 or 12. Particular attention should be paid to ventilation. Neglect of this is the reason why so many men get sleepy at an early hour, or find it impossible to perform their usual hourly task late at night. Men in bad health should always be excused, nor should women be kept at work later than 10 o'clock.

On morning newspapers good work ought to be expected from the men at every hour. Habit has made night work familiar to such compositors. If distribution is done in the afternoon and composition begins at 7, labor usually ends with all except three or four men at 2:30 A. M. Enough time should be allowed for supper, say fifteen or twenty minutes, at about 11 o'clock. Hands are entitled to demand compensation when standing around at night because they have nothing to do. They should either be allowed to set bogus or be paid by time. It is also just to allow something extra for very late work, say when detained to 4 o'clock or 5 o'clock in the morning.

Nipper-Gauge.—The adjustable gauge resting on the tongues of the feed-board of power-presses, used to give the proper head or side margin to the form, according to its position on the bed of a press.

Nippers.—1. A name in England for a small implement used for correcting type—especially tabular work—instead of the ordinary bodkin. It is known in America as tweezers, and is very little used in good offices, as it destroys and batters much type. 2. The appliances used to grasp the sheet after it is fed to the gauges in a power-press, and to hold it in position until the impression is received.

Nipping-Press.—A small screw standing press for the more expeditious cold-pressing of sheets.

Noiseless Form-Carriage.—A small truck with india-rubber bands around the wheels. It is used for the more easy removal of forms.

Nomparél (Sp.).—Nonpareil, six-point.

Nomperiglia (Ital.).—Nonpareil, but slightly larger than ours.

Non Collé (Fr.).—Unsized, unpasted, unglued.

Non Coupé (Fr.).—Uncut; the leaves not cut open for reading.

Non Rogné (Fr.).—Uncut; leaves untrimmed.

Non-Society Hands.—The words used in England to designate workmen who do not belong to the various printers' societies, the word society being used there in the same sense that union is in America. They are therefore non-union hands.

Non-Society Houses.—Printing-offices not recognizing the society scale or open to society hands.—*Jacobi.*

Non-Union Offices.—Those printing-houses which reject the rules and usages of the printers' unions, or which are not under their control.

Nonpareil.—A small type much used in book and job offices and on newspapers. In size it is between agate and minion, and equals in body half a pica. By the point system it is six points, several larger sizes of type being its multiples, as three-line nonpareil or five-line nonpareil. Twelve lines make an inch. The quantity of type of less dimensions than this in a book or job office is usually very small, and this size is generally employed for works where great compactness is necessary, as in directories and dictionaries. It is called nonpareille in French, Nonpareille in German, nonpareil in Dutch, nompariglia in Italian, and nomparél in Spanish.

This line is set in Nonpareil.

Nonpareil Brass Rule.—Brass rules cast on nonpareil body and used for borders or column rules.

Nonpareil Clumps.—Metal leads of that depth in body.—*Jacobi.* In America, nonpareil slugs.

Nonpareil Reglet.—Wooden furniture of nonpareil depth in body.

Nonpareil Slugs.—Slugs made of the thickness of nonpareil.

Norm (Ger.).—The signature.

Normanda (Sp.).—Full-face extended letter.

Norse.—The proposed name of a size of type of which the body shall equal two and a half points, or the half of pearl. It is purely theoretical.

North Carolina.—One of the Southern seaboard States of America, next south of Virginia. Printing began at New Berne in 1749, as stated by W. W. Holden of Raleigh, in that State, but according to Thomas it began in 1755. The North Carolina Gazette was then issued by James Davis, and its publication was continued up to the time of the Revolutionary War, with one prior suspension. In 1764 the Cape Fear Gazette was printed at Wilmington by Andrew Stewart. In 1776 there were newspapers printed at New Berne, Wilmington, Halifax, Edenton and Hillsborough. In 1812 there were three weekly papers at Raleigh, one of them, the Register, published by Joseph Gales. There were also weekly papers at New Berne, Wilmington, Edenton, Tarborough, Murfreesborough, Fayetteville and Warrenton. The first daily paper was the Raleigh Register, established in 1851. The total number of periodicals in 1810 was 10; in 1840, 27; 1850, 51; 1860, 74; 1870, 64; 1880, 142. During the last mentioned year there were 13 daily, 113 weekly and 16 other periodicals. In 1892 the total number of newspapers printed was 219, out of which 21 were issued daily and 160 weekly. The population is nearly all agricultural, and the cities are very small. Raleigh, the capital, Wilmington, Asheville and Charlotte do more printing than the other places. Much improvement is going on in this State and, it is probable the next census will show a great change in printing. Hitherto the State of North Carolina has been almost entirely agricultural.

North Dakota.—This State, formed by division from Dakota Territory, lies on the north line of the United States, at about the centre of the continent, east and west. The territory had in 1880 67 newspapers in all, the oldest having been founded in 1871. In 1892 there were 126 newspapers in the State, 8 of them being daily and 108 weekly issues. The chief towns are Fargo, Grand Forks and Bismarck.

Northumbrian Machine.—A rotary machine made for newspaper work, employed in England.

Norway.—Much printing is done in Norway, although the country is not rich. A few years ago statistics were compiled which showed that there had been issued during the twelvemonth preceding 956 books, 120 periodicals, 109 political tracts and 916 legal books, proceedings of societies, &c. There were 129 letter-press offices, 9 lithographic offices and several wood-engraving establishments in the country. The language is one of the Scandinavian tongues, and is substantially the same as the Danish.

Norwich.—A city in Connecticut. Printing began there in 1773, the printers being Timothy Green, the 3d, and Judah Paddock Spooner. Robertsons & Trumbull followed them. John Trumbull sided with his native country, and continued printing for many years. He died in August, 1802. Alexander and James Robertson were loyalists, and after being in Albany and New York went to Nova Scotia at the close of the War of Independence. Two daily and four other newspapers are now published at Norwich.

Nota di Paga (Ital.).—The compositor's bill, made out on a piece of paper.

Notation.—There are two common systems of notation of quantities, the Roman and the Arabic. The latter is sufficiently explained under ARABIC and FIGURES. The Romans depended chiefly upon six letters of the alphabet: I was one, V five, X ten, L fifty, C one hundred, and M one thousand. When a figure was to be shown larger than one of these simple ones, but not as large as the next, the additional letters required to bring it up to the proper size were added on the right, the larger nearest to the left. If a smaller letter preceded the larger it diminished it just that much. It became a rule, although not so originally, that no more than three of one kind should be together. Thus, instead of writing XIIII, it is written XIV; instead of IIII, IV; instead of MDCCCC, MCM. IↃ, or I with a reversed C, means a D, or five hundred.

A horizontal line drawn over any figure increases it a thousandfold. In printing, Roman numerals are generally used for larger subdivisions than are made by figures. The first sheet of a book is usually numbered in Roman, as it contains the title, preface and table of contents, which are added after the rest of the book is done, the main portion of the book beginning on the second or even perhaps the third signature with page 1. It is perfectly proper to put Roman numerals in lower case in their appropriate places, as in quotations from the Bible, as Matt. ii, 7; Luke iv, 21; Rom. xi, 9. No period is required after them in such a case, as they are not abbreviations.

The names of numerals, says Astle, are very different, not only in several parts of Asia, but in both North and South America. Small stones were used among uncivilized nations; hence the words calculate and calculation appear to have been derived from calculus, the Latin for a pebble-stone. Alphabetic letters had also a certain numerical value assigned them, and several Greek characters were employed to express particular numbers. The combination of Greek numerical characters was not well known to the Latins before the thirteenth century, although Greek numerical characters were frequently used in France and Germany in episcopal letters, and continued to the eleventh century. But of all the Greek ciphers the episema *ϐαῦ* was most in use with the Latins; it gradually assumed the form of G with a tail, for so it appears in a Latin inscription of the year 296. It is found to have been used in the fifth century in Latin manuscripts. It was reckoned for 6, and this value has been evinced by such a number of monumental proofs that there is no room to give it any other. Some of the learned, including Mabillon, have been mistaken in estimating it as 5, but in a posthumous work he acknowledges his error.

Those authors were led into this error by the medals of the Emperor Justinian having the episema for 5; but it is a certain fact that the coiners had been mistaken and confounded it with the tailed U, for the episema was still in use in the fourth century, and among the Latins was estimated as six, but under a form somewhat different. Wherever it appears in other monuments of the western nations of Europe of that very century, and the following, it is rarely used to express any number except 5. The Etruscans also used their letters for indicating numbers by writing them from right to left, and the ancient Danes copied the example in the application of their letters.

The Romans, when they borrowed arts and sciences from the Greeks, learned also their method of using alphabetical numeration. This custom, however, was not very ancient among them. Before writing was yet current with them they made use of nails for reckoning years, and the method of driving those nails became in process of time a ceremony of their religion. The first eight Roman numerals were composed of the I and the V. The Roman ten was composed of the V proper and the V inverted (Λ), which characters served to reckon as far as forty; but when writing became more general I, V, X, L, C, D and M were the only characters appropriated to the indication of numbers. The above seven letters, in their most extensive combination produce 666,000, ranged thus: DCLXVIM. Some, however, pretend that the Romans were strangers to any higher number than 100,000. The want of ciphers obliged them to double, treble and multiply their numerical characters fourfold, according as they had occasion to make them express units, tens, hundreds, &c. For the sake of brevity they had recourse to another expedient; by drawing a small line over any of their numerical characters they made them stand for as many thousands as they contained units. Thus a small line over I made it 1,000, and over X expressed 10,000, &c.

When the Romans wrote several units following, the first and last were longer than the rest: IɪɪɪɪI; thus vir after those six units signified sex-vir. D stood for 500, and the perpendicular line of this letter was sometimes separated from the body (thus: Iↄ) without lessening its value. M, whether capital or uncial, expressed 1,000. In the uncial form it sometimes assumed that of one of those figures: CIↄ, CD, ∞, ⋒. The cumbent X was also used to signify a similar number. As often as a figure of less value appears before a higher number it denotes that so much must be deducted from the greater number; thus, I before V makes 4, I before X gives only 9, X preceding C produces only 90, and even XX before C reckons for no more than 80. Such was the general practice with the ancient Romans with respect to their numerical letters, which is still continued in recording accounts in the English Exchequer. In ancient manuscripts 4 is written IIII, and not IV; 9 thus, VIIII, and not IX, &c. Instead of V five units (IIIII) were sometimes used in the eighth century. Half was expressed by an S at the end of the figures; CIIS was put for 102½. This S sometimes appeared in the form of our 5.

In some old manuscripts those numerical figures LXL are used to express 90. The Roman numeral letters were generally used in England, France, Italy and Germany from the earliest times to the middle of the fifteenth century. The ancient people of Spain made use of the same Roman ciphers as we do. The X with the top of the right-hand stroke in form of a semi-circle reckoned for 40; it merits the more particular notice, as it has misled many of the learned. The Roman ciphers, however, were continued in use with the Spaniards until the fifteenth century. The Germans used the Roman ciphers for a long time nearly in the same manner as the French.

The points after the Roman ciphers were exceedingly various, and never rightly fixed. It is not known when the ancient custom was first introduced of placing an O at top immediately after the Roman characters, as: A°, M°, L°, VI°, &c.

Note.—An explanatory passage, generally at the foot of the page. This is very common in books, but was yet more common in the early ages of printing. There are many passages too long for insertion in the text, or which show what authorities support, deny or modify the assertions there made, which are still valuable, and which are best placed at the bottom of the page. There are several systems of indicating notes. The first is by reference marks, the second by superior figures or letters, and the third by figures or letters inclosed in parentheses. By dividing these latter two there are in reality five ways, and it may sometimes happen that two or three of them shall be employed at once. The most common method is with reference marks. These begin with an asterisk (*), a dagger (†), a double dagger (‡), a section mark (§), a parallel (‖), and end with a paragraph mark (¶). Several other marks are known and are explained under REFERENCE MARKS, but these are all that are commonly used. Should the number prove too great for a page they are doubled. Two stars (**) and two daggers (††) follow each other down to the end of the marks, and on the third round there are three. Instances are not known of their occurrence beyond this, but it is possible that they may have been employed still farther, which would be perfectly proper. The second kind, where letters or figures at the top of a word are used, are coming more and more into vogue, as the careful distribution of ink on presses permits these small characters to be printed very clearly. They are usually in diamond, pearl, agate or nonpareil, the smaller the text the smaller being the superior letter. It is a serious fault to have bourgeois, brevier or minion figures thus used with a long primer text. The bourgeois might easily be confounded with the long primer, and there is not as much difference as there should be between the other sizes. The superior letter must be so small that there can be no opportunity for mistake. Where letters are employed they are generally in Italic, as in the word here^{a}, but Roman frequently occurs. Most old-fashioned printers leave out the j, and some the u. With figures, ^{27}, as shown, there can be no confusion in finding the order of the notes, and if there are no superior figures, but a smaller size of type justified in, they are more quickly justified than letters, as an em quadrat of the smaller size will fit below two of them and an en quadrat below one without a second's loss of time. Superior letters and figures are placed directly against the words to which they indicate reference, but other reference marks are separated by a thin space or hair space. Either of them can be inserted before or after, but it is usually better to place them after. Letters or figures in parentheses are separated from the words to which they refer by a common space, or even by an en quadrat, and are treated as words.

Their use in English is not very extensive, but the usual method on the Continent of Europe is to employ them. The letters are generally in Italic (*a*), as is here shown, but sometimes in Roman (b). The difference in the usage of the three does not seem to be very plainly marked, but in a volume of Byron's poems we may suppose the asterisk and its fellows used for the notes at the bottom of the page to explain particular English words; the figured references relate to notes at the end which are long and complicated, and the letters refer to another series at the bottom giving the derivation and signification of foreign words employed in the text. When the notes go on the same page the references begin and end on that page, the next page starting anew with an asterisk (*) or superior (^{1}) figure; but when either of them refers to an appendix or collection of notes at the end of a chapter, book or the volume, they continue until the last is printed. The proposition that notes shall continue over the two pages which face each other does not appear to be a good practice. Each note makes a paragraph at the bottom of the page; but where two short memoranda, neither filling half a line, come together it is good usage to put them both in the same line, separating them by three, four or more ems. The usual type for notes is the second or third size below the text, the third size more commonly with pica, English and small pica, and the second size for those below; but as the limit of legibility is soon reached, and as few offices have much type below nonpareil, that is regarded as good for bourgeois, brevier and minion, agate for the three sizes above it, pearl for nonpareil and agate, and diamond for pearl and agate. The notes are frequently solid, even when the text is leaded, and it has become customary to set them in two columns with a reglet between, although the text runs across the page. The reference marks and other reference characters invariably precede the notes. A note itself can have a reference. Where this is the case it ought not to be indicated by the same kind of marks which are used with the text. If those are in superior figures this should be with the asterisk and other reference marks, and if the text uses the reference mark then the secondary note should have the superiors.

Notes may be foot notes, just described, centre notes, marginal notes, or cut-in notes. Centre notes are rarely found in any other books than Bibles, where they stand between the two columns. They have the advantage of being protected from injury on the press, to which marginal notes are particularly subject. Marginal notes are usually placed on the outside margin of pages, on the right of odd pages and to the left of even pages. Where there are to be such references the page of type should be rather narrower in proportion to its depth than is common. The width given to them varies from two and a half to four ems of pica, which is subtracted from the margin, and the notes are separated from the text a lead or two. Very small type is used for marginal notes, which are placed against the matter to which they refer, if they are not crowded out of position by a prior reference. When the last is unfinished where the text is complete enough of this text is taken away to permit the marginal note to be completed. It runs across the page, at the foot, although starting at the side. If there is another series of notes in larger size the marginal notes continue down the side and end the page below the other notes. Cut-in notes have also a certain width, which varies from two and a half to five ems pica. It is not so imperative to have a very small type, but it must be minute enough not to be easily confounded with the text. Such notes have a slightly greater margin at the side nearer the body. It is considered the best usage to have them begin below the first line of a paragraph, and they cannot end in a break-line of the text. They can also run across the page, if incomplete, and precede side-notes. Foot-notes are frequently separated from the main matter of the page by a brass rule, but it is now more common to employ a line of quadrats. Sometimes a short brass rule or two or three two-em dashes separate the text and the notes.

Note Circular.—A circular printed on paper of note size. Engine-sized papers are preferable to tub-sized, as they require less labor in making ready. Flat letter, 10 by 16 inches, will be found a convenient shape if the circular is to be printed on three pages, and sometimes it will pay to employ double flat letter, 16 by 20 inches.

Note Headings.—The headings containing name and address, with business, printed at the top of a sheet of note-paper.

Note of Admiration.—A mark of punctuation, thus: ! It is usually called an exclamation mark.

Note of Exclamation.—The same mark as the note of admiration (!).

Note of Interrogation.—A mark of punctuation, thus: ? It is generally known as an interrogation mark.

Note-Paper.—A small size of writing-paper, used for correspondence. The usual size of commercial note is 8 by 10 inches, but it is sometimes made 8⅜ by 10½ inches. The usual weights per ream of such paper are from three and a half to seven pounds, the former being very thin and the latter heavy. Packet note is 9 by 11¼ inches. Bath note and ladies' note are small, quarto-shaped papers of variable size, about 6 by 10 to 7¼ by 11½ inches. Commercial note is the usual size employed in printing.

Nova Scotia.—One of the British colonies in North America, situated on the sea-coast north of New England. A newspaper was started in Halifax in January, 1752, by Bartholomew Green, Jr., who died within six weeks, and was succeeded by John Bushell of Boston. For a long time it was not issued at regular periods. Anthony Henry began its republication in 1761. In 1766 another paper started. There are now published in that province 7 daily, 46 weekly and 13 other periodicals. Halifax is the principal seat of printing.

Number.—1. Each face of type of a given size has a certain number given to it by the founder to distinguish it from other faces in his establishment, as bourgeois No. 18 or No. 16. These numbers are purely arbitrary, one founder's No. 12 possibly being the same as another founder's No. 6, the other No. 12 bearing no resemblance. 2. The number of impressions upon any given form. Long numbers are those where many impressions are taken; short numbers where the edition is a few hundreds or thousands. It should always be a printer's aim to give full numbers on all work.

Numbering.—Printing figures in consecutive order upon tickets, blank-books, election tickets or any other work. This is usually done in a bindery, the machine employed changing the figures between each impression. Machines of this class are made to employ four, five or six figures.

Numbering-Machine.—A mechanical appliance for numbering or paging purposes.

Numeración (Sp.).—Numerals. Numeración romana are Roman numerals; numeración arábiga are Arabic figures.

Numerals.—Numbering by means of Roman numerals, i, ii, iii, iv, &c., instead of Arabic figures, 1, 2, 3, 4, 5, &c. This is the common language of a printing-office, but is incorrect, as Arabic figures are just as much numerals as the others.

Número (Sp.).—Number or copy of a periodical or serial publication; figure.

Numéroter (Fr.).—To number, to page.

Numéroteur (Fr.).—Numbering machine.

Nuremberg.—A city in Germany where much good work is executed, but famous as one of the earliest places into which printing was introduced. Henry Keffer, who was a witness for Gutenberg in his suit at law in 1455, is supposed to have established himself as a printer at Nuremberg about 1469. His name appears for the first time in an imprint in 1473. In this latter year Anthony Koburger began to print in that city. Jodocus Badius, a rival in Paris, calls him the prince of printers. He had twenty-four presses at Nuremberg, and offices at Basle and Lyons. He printed twelve editions of the Bible in Latin and one in German. His most curious work, and the best known of all the incunabula, is the Nuremberg Chronicle, a summary of the history, geography and wonders of the world, issued in 1493. Three hundred wood-cuts were employed to illustrate this publication, some of them being used many times, representing one object in one place and another object in another place. Paris of Troy and the poet Dante were represented in this book by the same engraving.

O

O THE fifteenth letter in the English alphabet; oval in form. In Greek there are two characters for o—the short or omicron, and the long or omega. In the lower case the o is made a little higher than the n, to correct the optical illusion which would make it appear smaller than other letters. It is about an en quadrat in thickness, but frequently falls below. When the capital O is used alone it is immediately connected with a substantive or substantive sentence, and requires no punctuation mark or mark of exclamation after it; where Oh! is used it is an exclamation, and should be thus spelled. O in inscriptions signifies optimus. O also appears on many coins and as the initial of places and persons. It is the name given to the nine anthems which are sung in the Catholic Church nine days before Christmas. O with an apostrophe after it signifies son in Irish proper names, as O'Connell, the son of Connell. In French geography O stands for ouest, that is, west; in German, for ost, that is, east. In Masonry it is used for Orient. It also stands for Ohio. O. P. riots signifies Old Price riots. As a numeral it indicated 70 with the Greeks, and in Middle Latin it signified 11; with a dash over it this letter stood for 11,000.

Obelisk.—Commonly called a dagger, thus: †; usually serving as a mark of reference to foot notes. When thus employed it is the second in order, following the asterisk. In German printing it stands for deceased when affixed to the name of a person.

Objectionable Man.—On daily and weekly newspapers the objectionable man is the one who takes care of and distributes the type which otherwise would be avoided by the compositors, such as heads and Italic. It is usually the rule that the compositors must distribute every line in which there is a word or letter of Roman, although all of the remainder may be Italic, but the objectionable man distributes every full line of Italic. He also clears away all heads. His duties are also to save all headings and tables which are to be used again, and to put them in their proper places on the standing-galley, so that they may be convenient to pick up. He is responsible for the condition of that part of the standing-galley where these savings are placed, and must keep it in order. In some offices he divides up once a week all of the advertisements which are dead, and gives a certain portion to each man, thus insuring that all type shall be regularly put back into cases. For these various services he receives a fee from his fellow-workmen, a quarter or half dollar being levied each week upon each frame, the whole making a handsome sum. In small offices, or in those in which the heads are chiefly in Roman, the Italic small in quantity, and there are few savings, he receives a smaller amount and sets more or less type in addition. He is chosen to this position by his fellow-workmen, the majority ruling. The title is derived from his handling the objectionable matter, or matter which compositors object to or pass by in distributing.

Oblong.—This is the reverse of upright in speaking of any particular size, as, for instance, an oblong 8vo, not upright 8vo.—*Jacobi*. Oblong octavos, quartos and so on are those in which the page is much wider than usual, the width being greater than the height.

Obra (Sp.).—Work, book.

Occhio (Ital.).—Literally the eye, but in English the face, of a letter.

Octavo.—A sheet of paper folded into eight leaves. Commonly speaking, it is restricted to the size obtained by folding sheets of a certain determinate magnitude so that the leaves shall be not less than five and a half inches nor more than eight inches in width, and not of less length than eight inches nor more than twelve. The ordinary octavo of this country is 6 by 9½ inches. A quarto may be no higher than an octavo, but it is wider, and the duodecimo may be as wide as an octavo, but it is shorter and then has a scanty margin. Octavo is usually printed sixteen pages at a time, the sheet being then turned and printed again. In this case two complete octavo sheets are printed. Some large presses will take on sheets of double this size. In America the largest octavo is known as imperial octavo, the next size as super-royal octavo, the next as medium octavo, and the last as crown octavo. The sizes of the leaves are respectively 8 by 12, 7 by 10½, 6 by 9½ and 5½ by 8¼ inches. In England there is a slight difference on account of the paper there used, which, as to its measurements, is not the same as that made in America. Octavo is often abbreviated in writing as 8vo, and sometimes pronounced in conformity therewith eightvo.

Octodecimo.—A sheet folded into eighteen leaves.

Odd Folios.—Those pages which fall on the right-hand side of a book and are numbered 1, 3, 5, 7, &c.

Œ.—A diphthong of frequent use in Latin and the words derived from that language. Many editors of classical works separate the letters, giving them as coelo for cœlo. In German œ is written and printed as ö. Some proper names are exceptions.

Œil (Fr.).—The face (of a type). Literally the eye.

Off.—Pressmen are said to be off when they have worked off from a form the designated number of copies. The form is also off.

Off-Cheek.—The cheek or upright post of the hand-press on the farther side from the workman.

Off-Cut.—The portion of a sheet of twelves, &c., which is cut off before folding.

Off Its Feet.—A term applied to type when it is not standing upright. If type are thus printed from, one side of each type will have a heavy impression and the other a light one.

Office.—The room or shop in which a printer works. All other mechanics are employed in shops, the printer alone in an office. It is derived from the Latin officium; from the prefix ob and facere, to make or do. No other word is used by American printers for indicating the place where they work. Thomas, in his History of Printing, generally uses printing-house, and so do all the older writers on typography. When used abstractly, as "the office desires this done," it means the management of the printing-house. The word office is applied to the building or part of the building, the presses and materials, or the counting-room, together or separately.

Offset.—That portion of ink which leaves a newly printed sheet and is deposited on another sheet. Print-

k is a liquid, although tenacious, and when applied
: rollers to the types it is still in a moist form. The
ssion takes away most of the ink from the type and
its it upon the paper; but none of these operations
s it to become dry. It must remain in a wet con-
on the paper for some time before losing its moist-
nd if touched in the meantime by the fingers or
er sheet of paper some of it will smear or offset.
herefore an object in printing to have the ink dry
n as possible, to have a porous face for the paper,
t may sink in more quickly, and to prevent contact
other sheets. No press-builder or ink-maker has
able to realize his ideals in this matter, and even
: very best presses, with the finest ink, a certain pro-
n remains in a moist condition. If the paper is to
d immediately several plans are known for decreas-
e offset. Powdered chalk or magnesia will pre-
he impression or the paper from being injured by
t horizontal contact, although it will blacken if
d horizontally. Gum copal and other substances
l with the ink make it glossy and prevent it from
ening by mere contact. When sheets are run
gh hot rolls, as in Gill's hot-pressing machine, the
g of the sheet evaporates the moisture and the
ets absorb a certain portion. In Firm's press the
d sheets pass between a metal roller and a com-
on roller, the last touching the face of the sheet.
composition roller discharges on a metal roller
it takes up, and this roller is continually wiped
other contrivance. In some cases the sheets run
st paper rollers or against other sheets of paper,
are renewed at short intervals. Thus the offset
uced to very small proportions. The danger of
is the reason why perfecting-presses are very little
n this country. In England, where the bulk of the
is done upon them, the second side can always be
guished from the first by the slightly darker sur-
f the page.

-Side of Press.—The side of the press farthest
the workman.

lo.—One of the five American States formed out
at was known as the Northwest Territory. It is
sternmost of all of the States wholly settled since
merican Revolution, and lies on the north border
: Union, adjoining Ontario. Printing was begun
io at Cincinnati in 1793 by William Maxwell, who
d the Centinel of the North-Western Territory.
niel Willis, a Boston printer, established the Scioto
te in Chillicothe in 1796. No exact statement has
nade of the times at which printing was introduced
other towns of the State, but in 1810 there were
rnals; in 1840, 123; in 1850, 261; in 1860, 340; in
395; and in 1880, 774. Of these 56 were daily
s. In 1892 there were 1,146 newspapers in all, 121
g daily. Cincinnati leads all of the other cities of
tate in regard to newspapers, Cleveland coming
but at a long interval. The former has 12 daily
5 other periodicals; the latter 6 daily and 67 other
licals. Other important cities are Columbus, Day-
'oledo, Akron, Springfield and Zanesville. Many
print half a dozen papers each. Cincinnati has
extensive printing-offices, and there are many of
One is as large as any in the Union. The work
s city is largely in color-printing, playing-cards,
and books, besides general job-work. Very ex-
e lithographic works are located here. A great
f job printing is done in Cleveland, Toledo and
gfield. There are three type-foundries, two in Cin-
i and one in Cleveland. Book publishing is exten-
carried on in Cincinnati, Cleveland and Dayton.

ed Paper.—Prepared paper for copying pur-
It is sometimes used for set-off sheets.

(Sp.).—Face (of type, rules, &c.). Written on the
n of a proof-sheet or copy, the word ojo corre-
s to our Qy. or ?.

Oklahoma.—A territory in the centre of the American continent which was a wilderness three or four years ago. It has 36 newspapers, 4 of them daily. Guthrie and Oklahoma City are the principal towns.

Oktav (Ger.).—Octavo.

Old-Cut.—Anything pertaining to the old or antique style.—*Jacobi.*

Old-Cut Type.—Fonts similar to the Caslon old-faced type.—*Jacobi.*

Old English.—A term among book-lovers to indicate the kinds of type which most nearly approach those used at the beginning of printing, but more widely known as black-letter.

Old Face.—Another name for the kind of type known as old style, used in England.

Old Pelt.—An appellation for an old pressman in bygone days.

Old Style.—Type made in imitation of the Roman letters used before the beginning of this century. The standard is perhaps the letters cut by Caslon about 1750. It went out of use in England and America at about the beginning of the century, and continued unused until 1843, when it was again taken up in England and shortly after in America. The type-founders had become so thoroughly convinced that old-style type would never again be called for that nearly all of them destroyed their matrices. In 1843, as related by Talbot Baines Reed, Mr. Whittingham, of the Chiswick Press, in England, waited upon William Caslon, the type-founder, to ask his aid in carrying out the idea of printing in appropriate type the Diary of Lady Willoughby, a work of fiction, the period and diction of which were supposed to be of the reign of Charles I. The original matrices of the first William Caslon having fortunately been preserved, Mr. Caslon undertook to supply a small font of great primer. "So well was Mr. Whittingham satisfied with the result of his experiment that he determined on printing other volumes in the same style, and eventually he was supplied with the complete series of all the old fonts. Then followed a demand for old faces, which has continued up to the present time." The quantity of printing thus done, however, was inconsiderable before 1860. Joel Munsell of Albany and a few other printers in America had fonts as early as 1856, and by 1863 or 1864 it had become the fashion. After 1867 many faces of old style were cut, some retaining very little of the ancient peculiarities, as, for instance, Bruce's old style No. 20, and others exaggerating the angular serifs and other peculiarities like the Ronaldson from the Johnson foundry. Some of the faces produced were very bad, the punch-cutters imitating rude and badly formed characters of two or three centuries ago, when the taste of letter-founders had not been cultivated. The effect of this introduction of an old style has been that many printers have been obliged to keep twice as much body letter as formerly, part in old style and part in new style. Some, indeed, have the great preponderance in old style modernized, and some offices doing only jobbing-work have no Roman new style; but do all of their work in old style. Lately another form of old style has come in, originally brought forth in the Netherlands, known as the Elzevir or French old style. It does not answer so well for extended works as either of the two other kinds of Roman.

The distinguishing features of old style, as compared with new style, are the peculiar shapes of some of the letters and the angularity of the serifs. In new style such letters as T have a serif ending '. In the old style the letter ends `. This peculiarity is found in all of the serifs which admit of it.

In all of the original Roman characters after much printing was done a little of the heavy stroke at the top of the A was cut out. The B was thinner and the C and D were thicker. The bottom line of the E projected farther than the top line, and in the G the lower ending to the curve simply thickened as a perpendicular bar, not being divided at the bottom as at present. J fell below the line, and did not make a semi-circular curve. In K the two projecting bars in the specimen here shown meet the upright line together; in modern letters they do not. The upper one alone touches the perpendicular line; the lower one joins the upper one before it ends. In M the centre triangle was more obtuse than now, and N and O were much wider. The latter is nearly a true circle. Q had a very much longer tail than now, but there were different forms for it, as shown in the example. These were also much wider than at present. The right-hand stroke of the R extended much farther than at present. In T the arms were wider, the U and V were somewhat thicker, and in the W the two V's sometimes crossed at the centre. Y and Z were both wider, and the & represented to some extent the ET from which it was formed. The character herewith does not truly represent the approved form used a century and two centuries ago. In lower case there was more disproportion than now between the ascending and descending letters on one side and the small letters on the other side. It should be noted that in all genuine old style the face was smaller than at present, particularly bodywise. Most small letters now cover five-ninths up and down of the body of a certain face; in the earlier years it rarely passed beyond one-half. The new style Roman shown is very small in this respect, and probably is no larger proportionally than the size just given. The old style is smaller yet. Part of this lessened magnitude is restored by greater comparative thickness. The c, g, m, o, t and z are very wide; a, s and v are narrow, and the counters in b, d, g, p and q are large. Curves both in lower case and capitals are more symmetrical in the present cut, and more attention is paid to exact lining. The ends of the j, the f and the y have a dot in old style, but it is simply an enlargement of the previous line, and not a symmetrical one. In the e the cross-line is higher up than at present. Much, however, of the letter used in England in the last century did not conform to all of these rules, and the present old style has taken as its model many faces very distinct from each other. These have been much modified by the type-founders, the faces enlarged, particular letters changed, more angular serifs used, and everything tried which would cause one so-called old style to be more desirable than another.

ABCDEFGHIJKLMNOPQQRSTUVWXYZ &

OLD-STYLE CAPITALS.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

NEW-STYLE CAPITALS.

abcdefghijklmnopqrstuvwxyz

OLD-STYLE LOWER CASE.

abcdefghijklmnopqrstuvwxyz

NEW-STYLE LOWER CASE.

Olvidado (Sp.).—Out (words omitted by compositor).

On Grass.—A compositor taking casual work is said to be on grass. This is a good English definition, but the word grass is unknown in America in that sense, as is smout or smouting. One person employed by another workman for a short time is here called a substitute, commonly shortened to "sub;" but a compositor or pressman who takes a job, no matter how short, from an employer is not a substitute. He may be an extra.

On Lines.—A compositor on piece-work in England is thus described. The quantity of his work is measured by the number of lines he has set.

On Piece.—A printer engaged and paid by the result of work done.

On the Gathering-Board.—Work in course of gathering into books.

On Time.—When a man is paid by the hour or week, and not by piece-work, he is said to be on time. A very exact account of time should be kept, and an allowance made in the final bill for proofreading and superintendence.

One Fold.—In binding, a sheet with four pages, which requires only one turning or fold of the paper. Two fold, three fold, four fold indicate respectively eight, sixteen and thirty-two pages.

One-Sided Machine.—Ordinary style of single cylinder machines.—*Jacobi*. This is the most common kind of press in the United States, but the expression would not be understood by most American pressmen.

Ontario.—A thriving British North American province, formerly known as Canada West. Some historical references will be found to it under CANADA. There are now published in Ontario 507 newspapers, 44 being daily. Toronto is the chief city, and does much printing. The other principal towns are Hamilton, London and Ottawa.

Open Matter.—A term employed by printers to express fat and well-leaded work. It also stands for work having many blanks.

Open Spacing.—Wide spacing between the words of a line or different lines. See SPACING.

Open Work.—Well leaded or otherwise fat matter.

Opening.—When a compositor has copy in hand unfinished, the next man having finished his take, it is said that the first is in the opening.

Oregon.—One of the American States on the Pacific coast. Printing began at Oregon City in 1848, the Oregon Spectator then being published. The Oregon Free Press was issued in the same place in 1848 by George L. Curry. The total number of publications in 1850 was 2; in 1860, 16; in 1870, 35; and in 1880, 74, there being then 7 daily and 67 other periodicals. In 1892 there were 170 newspapers in all, of which 16 were issued daily. The principal towns in that State in respect to printing are Portland and Salem.

Oriental Type.—Letters cast for one of the Eastern languages, such as Hebrew, Syriac or Arabic. These faces cannot be procured in the United States to any great extent, and printers must obtain their supplies, except in Hebrew, from England or Germany. If there are only a few words, they can be drawn much larger than needed, then photographed and a process cut be made. When estimating on the composition of Oriental type, if the quantity is small and there is no expert in the office, ten cents a word to the workman is not too much to be given, with the customary employer's advance. Very likely even in that case the latter will then lose money.

Original (Sp.).—Copy, manuscript.

Orla (Sp.).—Border.

Orlar (Sp.).—To put a border around a job, &c.

Ornamented.—Ornamented type is that which varies from the regular form of Roman letter, and cannot be well enough described to be under a particular head, as antique, Gothic, script or full-face. It therefore comprises a great number of faces and styles, and each kind is known by a particular number, as Ornamented No. 72 or Ornamented No. 374. Many among these are very pretty and graceful, but others are monstrosities. Many varieties of ornamented are, however, known in the specimen-book of one foundry under a particular title, as Long Primer Cornwallis Condensed No. 3, in another as Gladstone Condensed, and in a third as Ornamented No. 999. Fancy alone dictates these names. Ornamented type is less desirable than other job type, and it should be bought very sparingly.

Orr, Hector, an old printer of Philadelphia, was born in that city in 1810. In 1832 he became foreman of Isaac Ashmead's composing-room, and soon after started in business for himself at 227 Arch street. He subsequently removed to 202 Chestnut street, where he remained until his death, which occurred on October 2, 1887. His specialty was xylographic printing, and almost his entire trade was in labels for druggists and others. He was a very ready and effective speaker, and was much in request at public dinners. His memory was very retentive, and he possessed a great fund of reminiscence. In 1866 and 1867 he contributed to the Printer's Circular of Philadelphia a series of articles upon printing in that city between 1800 and 1850, which were very valuable as well as very readable.

Orthography.—The art or practice of writing words with the proper letters according to common usage; spelling. If every language had sufficient characters to represent all of its sounds, the spelling following the pronunciation and the latter never varying, there could be no doubt as to the right spelling of a word, and any child would know how to write correctly. All languages, however, change more or less as time passes; there is a difference in usage in various parts of the same country, and still more when two or more nations speak the same language; words are taken from other languages, remaining unaltered or suffering little change; new words are coined from the old; writers differ in their belief as to the true sound or true spelling; and almost always the alphabet and the recognized combinations of the alphabet are insufficient to represent sounds invariably in the same way. It therefore results that in all highly cultivated tongues there are many words which violate any attempt to render sounds with accuracy in writing or in print, and in some languages, as English and French, the anomalies are very numerous. In none is there any serious effort to represent accent. German, Spanish, Italian, Portuguese, Dutch, Swedish and Danish in spelling follow the sound of the voice with considerable accuracy, which is not true of the English language. It is possible, for instance, for a German to tell the spelling of a word new to him simply from following the sound, something which would be impossible in English. Thus, in the line, "though the tough cough and the hiccough plough me through," there are as many sounds to the conclusion ough as there are words. Were it possible to represent these sounds in German each word would be differently ended, nearly as: "Tho thi tof caf and thi hickop plau mi thru." The th and the short u do not exist in German. The difference in spelling between the two languages shows that orthography is conventional. It does not represent the best spelling in any language, but only that which has become customary with a people.

English orthography is probably the worst known. It was not very good among the Old English or the Anglo-Saxons, as they are more commonly called, and words have been added from all other languages ever since without any attempt to determine the principles upon which they should be admitted. Many original English words have altered their spelling, and with it their pronunciation. Ask is a difficult word for most people to pronounce, and many illiterate persons say ax. This is really the older form, but the spelling was altered and two or three centuries of reading and writing among the common people have succeeded in changing their pronunciation to correspond to the written form. Under its oldest form, from A. D. 450 until A. D. 1066, English added some Greek, some Latin and some French words; in no case entirely respelling them. In its second form, from 1066 until three centuries after, it added many French words, some Latin and a few Greek, as well as altered to a great extent the spelling of the words in use at the time when William the Conqueror invaded England. The language had in its later years fewer grammatical variations than previously, and those which did not remain markedly important were varied in spelling. Yet this did not advance equally. Some forms were changed, while others remained unchanged. Thus in a passage in the Saxon Chronicle we find comon for came; thaet for that; nú for now; gyt for yet; haet for hight (called); stód for stood; westig for waste; betwix for betwixt; middel for middle, and ealle for all. The words and, is, of and on are now spelled as then. In the third period, covering the next two centuries, many Italian words were added, together with others from the sources above noted, and since that time they have been acquired from all other languages. Holland gave naval expressions, France those of war and cookery, Italy of music and the fine arts, ancient Rome those in medicine and law, and with Greece the terms of science and abstract knowledge. The writer who introduced a foreign word or coined a neologism spelled it as he saw fit, and after any word had been much used its spelling was very little altered. The pronunciation of many has changed, so that we cannot now form any idea of what was the original pronunciation of a word. Changes in spelling have been largely by guesswork, and not for well-settled reasons. In ten lines of a book now open before the writer the following anomalies can be picked out: General for jeneral; exhibited for egzibited; language for langwej; struck for struk; action for akshun; speak for spek; already for alredy; expressed for exprest; true for tru; and whereas for hwaraz. There are many others not quite so striking.

As therefore we have no rule, and can deduce none, we are driven in our attempt to find the true spelling of a word from analogy with pronunciation to authority. We need only to know the usage to determine what is right. To nearly all persons this means a dictionary. Few have that acquaintance with the usage of the best authors which will enable them to decide even in a few cases, and professed scholars who have taken up the study of the English language cannot remember the whole. Accordingly every printing-office and nearly every writer or author takes some dictionary as a guide. Even the weakest of them represents the labor and knowledge of several learned persons. In this country Webster has been the chief authority for many years, Worcester being his only competitor. There are several others, but none have yet been largely introduced. In England the orthography is more stable, having been settled to a great extent by Dr. Johnson. His book, revised by other scholars, but making little change in spelling the words which he gave, is still the chief English authority. The plan of Dr. Johnson was to give the orthography as he found it in books printed in the first half of the eighteenth century. The plan of Dr. Webster was, where he found two forms, to indicate that which was preferable, and he sometimes changed established spellings in order to reform some of the grossest abuses. Subsequent editors of the book now published as Webster's have modified many of his spellings, making them conform more closely to the older dictionaries. One of his changes was that of dropping the k in musick, physick and such words, and this is now followed in England. A second was dropping the u in honour, favour, labour and such words. In most of these cases the word was derived by the English from Latin, which has no u in such places, and not from Old French, which has this letter. Apparently the difference in the custom in England and America is likely to be permanent. English printers rarely spell such words without the u, and only one printing-office in the United States spells with a u. A third difference between Webster and Johnson was in respect to doubling the l in such words as traveller. One rule adopted by Webster was that a final consonant should not be doubled unless it was in the syllable which carried the accent. This rule was accepted by Johnson, but he did not fully carry it out. The modern followers of Johnson say that Webster's method might induce some persons to say trave-ler and leve-ler instead of trav-el-ler and lev-el-ler. In regard to this public opinion seems on this class of words to incline to Johnson and Worcester. In the latest edition of Webster both spellings are given. Where there was a very faulty method of spelling Webster sometimes undertook to alter the orthography to suit what he thought was right. Thus he spelled comptroller controller, molasses melasses, bridegroom bridegoom, feather fether, and zinc zink. All of these spellings, except the first, have been silently abandoned by his recent editors.

Printing-offices must practically adopt one of these dictionaries as authority and cause their compositors and proof-readers to amend their work by it. Reliance upon Webster's, Worcester's or the Century Dictionary does not necessarily imply that it is followed in any other respect than in regard to spelling. It cannot be an authority in compounding, for that depends upon the relation of the words to the whole sentence. Division can be followed or made to correspond to the derivation; but in regard to spelling, unless some lexicon is thus adopted as an arbiter, the proof-reader or the compositor never knows when he is to be overruled. The authority may be an author of whom he never heard. The great number of technical and scientific terms now in use can only be assembled in a dictionary, and no printer can buy all of the special vocabularies of the language. This Dictionary of Printing contains several thousand words peculiar to the printing art; electricity probably has as many in that calling; and music, military science and machinery are a few among the other occupations which have a large special word list. For immediate reference there is nothing except a general dictionary, although special lexicons embracing technical words may exist.

It has long been hoped that some reform would take place in English orthography. In Cherokee a child of ten years of age learns to read fluently in a month, understanding what it reads; and in German, as before said, there is a pretty close agreement between sound and spelling. An English person can learn to read German aloud in three days well enough for an educated German to understand him, although to the reader it conveys no signification. Fortunately that language was never much corrupted by foreign mixtures, nor was there much printing in it when Luther fixed its standards. Since that time its tendency has been to simplicity, although there are still some anomalous forms. Seyn and many such words, thus spelled two hundred years ago, changed naturally to sein, and of late there have been reformers who have endeavored to drop silent letters, as the h in theil, a part. The new spelling is teil. The revised orthography has been taken up by the government; but, judged from an American standpoint, the change seems little, and most of the German works now published in Germany, Austria, Switzerland and the United States pay no attention to the new theory. French orthography has much altered since the time of Rabelais, but it is still chaotic. Many words have been changed within a century. Holland affords the only instance known of a real change in orthography accomplished in a short space of time. The government ninety years ago commanded the new spelling to be used in the schools, the public offices and the army and navy, and it soon superseded the old. Yet the differences, although considerable, do not appear so in comparison with the whole number of words in the language. It had before that an orthography which would seem to our spelling reformers as more phonetic than anything of which they could dream. An example is given from the first four verses of the twenty-first chapter of Luke, the old extract being that of Dort in 1637 and the new in the spelling of the present day:

OLD.—1. Ende opsiende sagh hy de rijke hare gaven in de schatkiste werpen.

2. Ende hy sagh oock een seker arme weduwe twee kleyne penninghskens daer in werpen.

3. Ende hy seyde: Waerlick ick segge u, dat dese arme weduwe meer dan alle heeft in geworpen.

4. Want die alle hebben van haven overvloet geworpen tot de gaven Godts; maer dese heeft van haer gebreck alle den leeftocht die sy hadde daer in geworpen.

NEW.—1. En opziende, zag hij de riken hunne gaven in de schatkist werpen.

2. En hij zag ook eene zekere arme weduwe twee kleine penningen daarin werpen.

3. En hij zeide: Waarlijk ik zegge u, dat deze arme weduwe meer dan allen heeft in geworpen.

4. Want die allen hebben van hunnen overvloed geworpen tot de gaven Gods; maar deze heeft van haar gebrek al den leeftogt, dien zij had, daarin geworpen.

For the last fifteen or twenty years attempts have been made to change the spelling of English in some particulars, so as to render it more philosophical. The Chicago Tribune has advocated the new fashion, and it has been followed in this by perhaps a hundred other newspapers. The new orthography has received the sanction of several learned bodies, and the proposed amendments seem to be sensible, considered by themselves. The changes are as follows:

1. Drop ue at the end of words like dialogue, catalogue, &c., where the preceding vowel is short. Thus spell demagog, epilog, synagog, &c. When the preceding vowel is long, as in prorogue, vogue, disembogue, retain final letters as at present.
2. Drop final e in such words as definite, infinite, favorite, &c., when the preceding vowel is short. Thus spell opposit, preterit, hypocrit, requisit, &c. When the preceding vowel is long, as in polite, finite, unite, &c., retain present forms unchanged.
3. Drop final te in words like quartette, coquette, cigarette, &c. Thus spell cigaret, roset, epaulet, vedet, gazet, &c.
4. Drop final me in words like programme. Thus spell program, oriflam, gram, &c.
5. Change ph to f in words like phantom, telegraph, phase, &c. Thus spell alfabet, paragraf, filosofy, fonetic, fotograf, &c.
6. Substitute e for the diphthongs æ and œ when they have the sound of that letter. Thus spell eolian, esthetic, diarrhea, subpena, esofagus, atheneum, &c.

N. B.—No change in proper names.

It is not probable that this change will ever be effected. Comparatively few words are altered, and if English orthography is ever to be made sensible another reformation must begin when this is accomplished, and after that another, and so on to the end. The language all the while would be in a state of transition, and old persons could never be sure of their orthography. Scarcely one word in ten is now spelled as pronounced, and to attempt to improve the orthography of the tongue five hundred words at a time out of a total of two hundred thousand would seem to be a very curious way of attaining the required end. Webster's orthography has made no headway in England; savour and honour still have the unnecessary u, although condemned by all philologists there as well as here, and probably not twenty well-known words have been changed in spelling in the mother country since the year 1810. No sensible man will attach much importance to the claim that the derivation of the word is shown by the spelling, as many words have been altered in deference to a false origin, and others indicate no derivation at all. Children and illiterate persons could learn to read much more easily, and the pronunciation of uncommon words could be indicated so that any one would know the proper way. There is, however, too great an inertia to overcome, and there are too many persons to be consulted who would themselves derive no advantage from a new spelling. Books are written for those who can already read with ease. They are accustomed to the old spelling; the new form seems unduly familiar. Highly educated persons will dislike it, as highly educated Englishmen dislike the spelling of words like labor and favor. If no more than the rules of the Philological Association were followed it would be difficult to develop interest enough to have them adopted; if a complete change were to be made many vested interests would be affected. The new orthography would be offensive to all who had learned to spell in a prior generation. Compare the following, which has the long vowels doubled, the short ones remaining as now, with the present orthography:

"Thow hipoocrit, furst kast owt thee beem owt of thiin oon ii, and then shalt thow see cleerli tu kast owt thee moot owt ov thii bruthur's ii."

Even this is to a considerable extent imperfect, as characters are needed for th and other sounds. It is safe to say that no newspaper which aims at a general circulation would invite ridicule by printing its paragraphs in this way, or having half of the changes. Neither would books intended to be read by any except scholars be published in this form of orthography. Book publishers would oppose a new orthography, because it would diminish the sales of their books for years; newspaper publishers, because their journals would have less circulation; and printers, because their compositors would demand increased pay and their proof-readers would take more time. All fonts must be sorted up anew. We now know that where e occurs three times in the lower case n is found twice and u once; but no one could tell us in what proportions they would run with an amended orthography, independently of the new characters, such as oo, the two th's and the diphthongs, which must be bought. It probably would require 20 per cent. more of the alphabetical sorts to make the font run out even. For these reasons it is doubtful whether the change will ever be seriously contemplated. The sluggishness and the unwillingness of the trade to change are very remarkable. Even to this day v and j come at the end of the alphabet, because two forms of i and u did not exist at the time when printing was invented, and in England the figures are yet at the top of the capital case, because such was the usage two centuries ago. Colleges and schoolmasters are lending this reform very little aid, and editors, reporters and authors have no desire to change. The movement comes from a few well-educated persons, and has awakened no response elsewhere.

The most common rules for the English orthography of the present day are those which were laid down by Dr. Johnson himself nearly a century and a half ago, and even they are not strictly followed anywhere. Each writer and each dictionary maker thinks himself at liberty to vary somewhat. As stated by Savage these rules are:

I.—Monosyllables ending with f, l or s, preceded by a single vowel, double the final consonant; as staff, mill, pass, &c. The only exceptions are of, is, as, has, was, yes, his, thus, this and us.

II.—Monosyllables ending with any consonant except f, l or s, and preceded by a single vowel, never double the final consonant; excepting only add, ebb, butt, egg, odd, err, inn, burr, purr and buzz.

III.—Words ending in y, preceded by a consonant, form the plural of nouns, the persons of verbs, verbal nouns, past participles, comparatives and superlatives by changing y into i; as spy, spies; I carry, thou carriest; he carrieth or carries; carrier, carried; happier, happiest.

The present participle in ing retains the y that i may not be doubled; as carry, carrying; bury, burying, &c.

But y, preceded by a vowel, in such instances as the above, is not changed; as boy, boys; I cloy, he cloys, cloyed, &c.; except in lay, pay and say, from which are formed laid, paid and said, and their compounds, unlaid, unpaid, unsaid.

IV.—Words ending with y, preceded by a consonant, upon assuming an additional syllable beginning with a consonant, commonly change y into i; as happy, happily, happiness. But when y is preceded by a vowel it is very rarely changed in the additional syllable; as coy, coyly; boy, boyish, boyhood; annoy, annoyance, annoyed; joy, joyless, joyful, &c.

V.—Monosyllables and words accented on the last syllable, ending with a single consonant preceded by a single vowel, double that consonant when they take another syllable beginning with a vowel; as wit, witty; thin, thinnish; to abet, an abettor; begin, beginner; but if a diphthong precedes, or the accent is on the preceding syllable, the consonant remains single; as toil, toiling; offer, offering; maid, maiden, &c.

VI.—Words ending with any double letter, except l, and taking ness, less, ly or ful after them, preserve the letter double; as harmlessness, carelessness, carelessly, stiffly, successful, distressful, &c. The remainder of this rule, as given by Savage, is not generally followed in America. He writes fulness, skilful, while we write fullness, skillful. He gives two other examples, skilless and fully. The former word is never heard or written, and the latter, as well as the other, comes under a rule not given by him, that three identical letters cannot come after each other, except in the possessive case, when we can say Voss's Lexicon, Ross's property.

VII.—Ness, less, ly and ful added to words ending with silent e do not cut it off; as paleness, guileless, closely, peaceful, lovely, except in a few words, as duly, truly, awful.

VIII.—Ment added to words ending with silent e generally preserves the e from elision; as abatement, chastisement, incitement, &c. The words judgment, abridgment, acknowledgment are deviations from the rule. Like other terminations it changes y into i when preceded by a consonant; as accompany, accompaniment; merry, merriment.

IX.—Able and ible when incorporated into words ending with silent e almost always cut it off; as blame, blamable; cure, curable; sense, sensible, &c.; but if c or g soft comes before e in the original word, the e is then preserved in words compounded with able; as change, changeable; peace, peaceable, &c.

X.—When ing or ish is added to words ending with silent e the e is almost universally omitted; as place, placing; lodge, lodging; slave, slavish; prude, prudish.

XI.—Words taken into composition often drop those letters which are superfluous in their simples, as handful and withal.

The plural number of nouns is generally formed by adding s to the singular; as dove, doves; face, faces; thought, thoughts. But when the substantive singular ends in x, ch soft, sh, ss or s we add es in the plural; as box, boxes; church, churches; lash, lashes; kiss, kisses. If the singular ends in ch hard the plural is formed by s alone; as monarch, monarchs; distich, distichs. Nouns which end in o sometimes have es added in the plural; as cargo, cargoes; echo, echoes; hero, heroes; volcano, volcanoes; negro, negroes; potato, potatoes; manifesto, manifestoes; wo, woes; but sometimes they are spelled cargos, echos, heros, volcanos, negros, potatos and manifestos. To-day wo is rarely used. It is nearly always spelled woe, and forms its plural woes. The following are never spelled with an e before the s: Folios, juntos, nuncios, punctilios.

Nouns ending in f or fe are rendered plural by the change of these terminations to ves when there is the accompanying change of sound: as loaf, loaves; half, halves; wife, wives. Those in which the sound is not changed do not change the spelling, except to add s; as grief, griefs; relief, reliefs; reproof, reproofs. But some form two plurals and are pronounced differently; as staff, staffs, or staves.

Nouns which have y in the singular, with no other vowel in the same syllable, change it into ies in the plural; as beauty, beauties; fly, flies; but the y is not changed where there is another vowel in the same syllable; as key, keys; delay, delays; whiskey, whiskeys; monkey, monkeys; attorney, attorneys.

Proper nouns become pluralized by adding s; as Cicero, Ciceros; Bruce, Bruces; Mackay, Mackays; Day, Days. The letters of the alphabet take their plural by adding an apostrophe with the letter s; as A's, B's and C's; mind your p's and q's.

Some words follow an old plural, either derived from the Anglo-Saxon or originating in the transition time between the Conquest and the reign of Queen Anne, as oxen, children, men, aldermen, geese, teeth. Lists of these will be found in the larger grammars, as well as the words borrowed from the Latin, Hebrew and Greek languages; as cherubim, indices, effluvia, magi, metamorphoses. Many of these have both regular and irregular plurals. As examples may be given criterions, criteria; media, mediums; memoranda, memorandums. Sometimes there are differences of meaning between the two, as in indices and indexes.

In Scotch orthography a is frequently used for o; as aith for oath, ane for one, twa for two, hame for home.

Qu is in Scotch generally substituted for w; as quha for who, quhair for where, quhilk for which. U is often substituted for the English oo, as guid or gude for good, stude for stood.

In dialect stories, now very common, an effort is made to represent the words which vary from the ordinary pronunciation as phonetically as the English letters will permit it to be done. Elisions are shown by apostrophes, accented syllables are sometimes indicated by an acute vowel, and two dots over a letter indicate a diæresis. It is wrong, however, in either dialect stories or poems or any other matter to create a new spelling simply because many of the other words are altered, although the pronunciation remains unchanged. In the following several words are wrong:

"Wall, I swaow," sed he; "I'd a bin a fyule to do sich a thing."

Sed is here misused for said, and bin for been. The latter was Hawthorne's shibboleth to tell whether a man who applied to him for aid when he was consul at Liverpool was a fellow-countryman. All Americans who pronounce English correctly say sed and bin, and spell said and been. Much must, however, be allowed to authors. A misspelling occasionally seen is to insert a capital letter in the centre of a man's surname, as BoDine, AtLee, GaNun. These three are actual examples, but the reasoning upon which they are supported is indefensible. A capital cannot be used in the centre of a word. In the cases of MacLean, VanAartsdaalen, DeBaun or O'Neill, these are really two separate words, in which the space may or may not be left out. Custom has sanctioned this spelling, and not the other. Greek and Latin proper names must follow copy, whether Perikles or Pericles, Caesar or Cæsar. Some of the reformed Greek spellings appear very repulsive to the eye, accustomed as the English-speaking peoples have been for centuries to have a conventional form. There are also exact transliterations of East Indian words and of Early English proper names.

Foreign place names are generally determined by a reference to a good gazetteer, but as many of them are almost unknown it has generally been the custom to let the spelling of minor localities be decided by the copy. The printer cannot be expected to have works minute enough to verify all of them. Of some there has never been a determination of the true form, even among those resident near the place and best qualified to judge. In the neighborhood of New York is a strait called Hell Gate and Hurl Gate; in New Hampshire is a mountain known as Moose Hillock or Moosilauke, and in Western New York is a village which has now been settled for over a hundred years and of which the name is spelled Skoyz, Scawace, Schoys and twenty other ways. No printer can decide these things. The United States Government lately appointed a commission to determine the spelling of geographical names, which will settle many of them.

Quotations from foreign languages must follow copy, except in offices where these languages are made a specialty. A proof-reader should have a moderate acquaintance with Latin, German and French, but it need not be very profound. So far as foreign phrases or words are given in dictionaries, he should correct the proof to conform to them; but it is too much to expect an English proof-reader to know that veult is an old form in French for veut, or that there is another word in Latin for horse besides equus. Neither can accents be provided for all foreign tongues. Some have a dot under certain letters, as under z in Hindustanee; others a curve over the e, as in Eskimo, and others a stroke across the lower bar of a p, as in Mayan. In books where these are necessary the editor must be the authority for their use.

Ortografia (Ital. and Sp.).—Orthography.

Ôter (Fr.).—To take away.

Ounce Mark.—A medical sign, thus: ℥.

Out.—A compositor is said to be out when he has composed all of his copy. An out is also a word or number of words omitted while setting. This is very frequent with some compositors, but the habit can be overcome by attention and by reading the lines as they are composed.

Out of Boards.—When a volume is cut before the boards are affixed it is done out of boards. Nearly the whole of common work is done out of boards.

Out of Condition.—Printing rollers not in good order for working.

Out of Copy.—When a compositor has finished his portion of copy, or the whole of the copy in hand is finished.

Out of His Time.—An apprentice who has completed his indentured term is thus described.

Out of Letter.—When type is all used up.

Out of Register.—A sheet is out of register when the pages do not back accurately upon each other. This defect comes largely, when the workman knows his business, from the fact that wood is used for the interior furniture of the forms. This contracts, swells and warps continually. When this is the case nothing can be done except to rectify it by changing pieces, by enlarging and diminishing them, and by inserting or taking out leads. A good device, when a form must be very exact and there is enough work to justify it, is to take a piece of brass like a column rule and cut out where the pages should come. This is set directly over the pages. If they are the least out of register the hollows will not take in the pages, and the projections cannot enter the gutters. Another one going the long way will insure accuracy in length. Bad register sometimes results when the forms are not properly locked up. The forms may lift and still be skewing.

Out of Sorts.—When a certain letter has been set out, the case having no more, the compositor is said to be out of sorts.

Out of Truth.—When a book is not cut square.

Out of Use.—When type or other material has been unemployed for a long time.

Out Page.—The first or signature page of a sheet.

Outer Form.—The form containing the first page of a book, the corresponding page on the next signature, and so on.

Outer Tympan.—The larger tympan, into which the inner one fits.

Outside Reams.—Reams of paper made up entirely of outside or damaged sheets.

Outsides.—The top or bottom sheets of a ream, often damaged and called retree. Probably from the French retirée, or withdrawn; the sheets not up to the standard.

Ovals.—Borders or frames oval in form, made of brass.

Overlay.—1. To secure proper effects in printing by means of graduated impression between the impressing surface and the sheet, using different thicknesses of paper for that purpose. 2. The sheet, piece of paper or pieces of paper placed between the form and impression surface to secure a graduated impression. This overlay may either be a small piece of paper anywhere upon the cylinder or tympan, or it may be elaborate, made of several thicknesses of paper, and intended to bring out the various effects of wood-cuts. In most New York offices the former, or simple work, is known as patching, and in these offices the word overlay is restricted to the carefully considered and prepared combination used with wood engravings. The term overlay is also loosely but inaccurately given to the additional sheets of paper or other substances intended to increase or to soften the pressure everywhere. These are really blankets. The pressman when he lays his form upon the press has perhaps in one place some very open matter, with many leads and many break-lines; in another there is solid matter; in a third there is a wood engraving, with many black places, and in a fourth is an outline engraving. Should there be an equal pressure everywhere the open matter would indent the paper; it would look too black, and possibly would be crushed. This would also happen with the outline engraving, while the wood-cut, with many solids and requiring much ink, would be insufficiently provided with the latter and would present a gray appearance. The art of the pressman is to apply pressure to each place as it shall be needed, so that the part which requires much color and much impression shall get it, and that which needs little shall be relieved of a part of the pressure. If the form is all of type the problem is comparatively easy, although it takes much experience to judge as to inequalities and the amount of patching required; but if there are cuts of different kinds, intermixed with type, the problem is very difficult, and in addition to much experience and manipulative skill calls for an artistic eye, so as to perceive the fine points of the engraving and to judge whether an increase of ink and pressure in any one place will enhance its clearness or its beauty. Those who follow this branch of the art should accustom themselves to the examination of engravings and paintings, so as to see how great artists have accomplished their work. The eye must be educated in order to judge effects. This is best attained by careful scrutiny of the printing of wood engravings as practiced in good offices, using this term as including all xylographic work, including process cuts.

When the form is first put on the press it must be made perfectly level. Pieces of paper are pasted beneath the plates or cuts, if they happen to be low, in order to raise them to the proper height. Cuts which are too high must be shaved down.

After the underlay is completed and register is made a tight sheet is drawn on the cylinder and a few waste sheets are run through the press to obtain a steady impression, after which the impression is pulled on the tight sheet or packing on the cylinder. The cut overlay is then pasted on the packing in the most exact position, for unless this is done accurately the cut overlay is rendered ineffective in producing the results sought. The making ready then begins. The cylinder of every press, if properly set, carries for making ready between seven and eight sheets, which, when in position on the cylinder, must be even with the cylinder-bearers; otherwise the cylinder and the bed will not travel at the same speed, a requirement indispensable for good register. The first sheet is then pulled, and the parts which appear heavy are cut out and the lighter parts are patched with manilla paper as may be required. When this sheet is cut away and patched it is put on the cylinder, and a second sheet, on which there is less patching up to be done than on the first, is then pulled. This second sheet is next prepared in like manner and put on the cylinder, after which the third and final sheets, on which the marking out and patching up are of the most delicate character, are manipulated similarly to the first and second sheets. This completes the making ready of the form.

A cut overlay differs from patching by the greater care and elaboration in its preparation, and by the fact that the overlay is prepared as far as possible before the form goes to press. When a cut for which an overlay is to be made is received it is put into the hands of the pressman and is then placed on a hand-press, where a number of different proofs are taken on different thicknesses of paper, say from five to seven. The proofs are then laid out for the ink to dry. The overlays are cut from these sheets. Sometimes the overlay-cutter will work with an artist's proof before him to guide him in making his overlays, but as a general thing an experienced man does not use any model. It takes at times from three to five sheets, besides a foundation sheet or covering sheet. Great judgment must be exercised in cutting out from the sheets and also in pasting together the overlays thus obtained.

In really artistic work, such for instance as Cole's reproductions of paintings by the old masters, a proof is taken by the artist himself or by a man who makes a specialty of proving wood-cuts for artists and the trade. By delicate manipulation and by putting a little more pressure here or there the engraving is shown in a state which can hardly be rivaled by the printer, except as to the full blacks. There he has something of an advantage, as his machine is stronger. Should the pressman have one of these proofs to look at he is able to ascertain what results he ought to attain, and can make an effort in that direction; but generally he has only the block or plate, and must experiment with that. Experienced men are able to obtain exceedingly good results, when the difficulties of ascertaining what the engraver intended are considered. As a rule the cuts require much pressure, but from this the light portions are excluded. The cutting is done with a knife, variously formed, but frequently like that of a shoemaker. The end is in the shape of a wide V, and is so made that the blade can cut either to the right or the left. Others are very similar to the erasers used by bookkeepers, but all have a point and two cutting edges. In cutting the blade does not go perpendicularly through, but slantingly, so that there is no sudden break off of the paper. Some pressmen on some paper tear the edges. As one proof is cut the part or parts retained are added to the overlay, each in its exact place, line matching line. A failure in this respect destroys the entire value of the overlay. The paste is common bookbinder's paste, rather stiff. Many pressmen dab a small quantity on the left hand, at its back, just where the thumb joins on, and use the forefinger of the other hand to put on the requisite amount of paste. If too much is used it gushes out at the side when pressure is applied, and is too long in drying. By adding in certain places and taking away in others the cut overlay is at length completed and is affixed to the foundation sheet. If the engraving is of great variety and of high merit the work is not then completed. It will be found that it is necessary here and there to relieve the pressure, and occasionally more must be added.

Experienced men in very delicate cases sometimes use the very finest and thinnest of tissue paper rubbed down at its edges. When an overlay of ordinarily thick paper is put upon one part of an engraving its thickness to some extent relieves the pressure upon the part next to it, and that must be reinforced. Again, the part next to a blank has an undue pressure, which must be relieved by cutting away or scraping down the sheet directly above it. It is a very easy thing to crush a tender line. An engraving should not all be printed in a uniform, gray hue. This may do well enough for a background or a sky, but in engravings some parts are or should be charged with color, some having a considerable amount and others very little. Parts will be completely blank. It is therefore necessary to apply pressure wherever the darkest color is to come, and to take away nearly the whole where there is to be a light spot, accentuating and heightening the contrast. Type must be printed of exactly an even color throughout, no matter how many or how few the engravings scattered through it. Specimens should be taken of the first sheet to compare with subsequent ones, so that exactly the right color may be preserved; and this must not be allowed to vary. Neither must the edge of the type near a cut be either faint or heavy. After all the overlaying is done the last sheet is drawn smoothly and evenly over the cylinder, and the form is ready for printing.

Card overlaying is used upon illustrated papers and other work where much pressure and much ink must be had in particular cases, other parts being graduated down, although there is hardly enough time to do justice to the work in the ordinary way. A sheet of three, four or five ply cardboard is affixed to the packing. The different results are obtained by the varying thickness of this board. Where it is not cut away at all is the fullest black; where one thickness is cut out the ordinary black is shown; when two are cut out the ordinary middle ground is left; but when more is detached the blanks or light spots are seen. This method admits of great quickness, and when an error has been committed a little patching can also be resorted to.

Both underlaying and overlaying seem to have been known many years ago; but the modern method of considering them of great importance was plainly a long while in coming to maturity. Very little overlay is visible in the Penny Magazine or in similar work of the decade between 1830 and 1840, and an early New York price-list asks for the pressman on cut-work only six and a quarter cents a token extra pay, thus showing that there was very little time occupied in making ready. Adams, the engraver, who undertook in 1842 to get out an illustrated Bible for the Harpers, was the first who spent much time in making ready. Since that time more and more attention has been paid to the matter. Alvord, a New York printer, who in his day, between 1844 and 1870, had a great reputation, had a number of safes full of overlays which he had saved after using once, expecting to use them again. The introduction of dry printing and of surfaced papers enabled great advances to be made in presswork, and with each advance a more perfect make-ready became necessary. The chief illustrated magazines now require four days to get ready a form when largely illustrated with the best engravings; minor magazines take a day or a day and a half. The time that the press is stopped on account of the preparation of overlays should properly be charged against the job, unless an increased price is named per token or per thousand for this very reason, or unless the run is so long that the original preparation becomes insignificant. If no press is stopped the time of the cutter of overlays should be taken and doubled, this then being added to the bill. See UNDERLAY and PRESSWORK.

A new method of making overlays has lately been attempted. It is practically painting the foundation sheet with a strong paint which is laid most thickly on the spots where the full blacks are, and less thickly on the middle tints. The advantage is that the overlay can be applied much more quickly; but thick paint would be apt to crumble and break under pressure, especially if there was enough dryer in it to enable the work to be used in a few minutes. It is not believed that this method has been tried in the United States.

Overline.—In an interlinear translation the line containing the text which is to be translated, which is over the gloss.

Overplus.—The plus or over copies of a definite number in printing.—*Jacobi*.

Overrunning.—Carrying words backward or forward in correcting, or doing the same with portions of columns or pages. These are very slow operations. It is not permissible to space badly in order to insert words or to take them out, and therefore eight, ten and twenty lines must frequently be gone over before a line is gained or lost. The largest space allowable on ordinary measures in bookwork is two three-em spaces, and the smallest is a five-em space. On work where these alternatives are permitted the compositor must take that which is most expeditious. If the paragraph then happens to be rather widely spaced and the amount to be got in is no more than a couple of words, it will generally be found easiest to take in; but if there is half a line and the matter is not widely spaced it would be quicker to drive out. A little run-over galley would be very convenient for this purpose, a number of grooves being in it. Nothing is permissible in ordinary measures in overrunning which is not permitted in setting in the first place. Hair-spacing, for instance, is not sanctioned. On daily newspapers it is considered proper to space as widely as an em for the purpose of getting in an out or taking out a doublet. Running over of pages must be done with great care, particularly if they are imposed. If the furniture is not wooden and there are no cuts, it would be better to wet the type, although this is against the customs of the trade. Care should be taken in overrunning that a break-line does not come at the head of a page or column. All of the other minutiæ must also be observed.

Overseer.—A foreman. This word, as applied to a printing-office, is English. It is never thus used in the United States.

Overtime.—Work in addition to the usual number of hours. This is never profitable to the employer, and rarely to the workman, as he loses much the next day. Overtime should be charged for at an increased price, both by the employer and the workman.

Own Paper.—A book is said to have a proof on its own paper when the proof is taken on a sheet of the size and quality to be used for the edition.

Oxford.—This is the seat of one of the great universities of England, where printing was practiced within a year of its introduction at Westminster. There is indeed a St. Jerome at Cambridge which declares at the end that it was printed at Oxford in 1467, several years before Caxton began. In 1664 Richard Atkyns of London declared in a book which he then issued that Frederick Corsellis, an under-workman for Gutenberg, had been a printer at Oxford at a very early period. He said that when the art of printing made some noise in Europe Thomas Bourchier, Archbishop of Canterbury, moved King Henry VI. to use all possible means to procure it to be brought to England. The king approving the proposal dispatched Robert Turnour (who was then master of the robes and high in favor with the king) into Flanders, furnished with money for the purpose. One thousand marks were judged necessary, towards which sum the archbishop contributed three hundred. Turnour took as his assistant William Caxton, a man of abilities and knowledge of the country, and these two found means to bribe and entice over into England one Frederick Corsellis, an under-workman in the printing-house at Haarlem, where John Gutenberg had lately invented the art, and was then personally at work. Corsellis was immediately sent down to Oxford under a guard to prevent his escape and to oblige him to the performance of his contract. He produced the book above mentioned, but without any name of the printer.

The assertion of Atkyns rested upon an alleged record at Lambeth, which has not since been seen by any writer. The event must have happened before 1459, for Edward IV. was proclaimed in that year, yet no fruits followed until 1467, eight years after. Both Caxton and Junius are silent as to this transaction, although the latter had the strongest interest to use the story, as it redounds to the credit of Holland. A biographer of Archbishop Bourchier living shortly after does not allude to the matter, although it would have been, if true, one of the most remarkable achievements of the prelate's life. We know from court documents that Gutenberg was not in Haarlem at about the time given, for he was in Mentz. There was besides a reason why Atkyns should fabricate such a story. He was engaged in an expensive suit at law with the Company of Stationers, and desired to show that their privileges were usurpations, the credit of printing in England first belonging to the king, from whom he had a license to do things which conflicted with them. Nothing additional has ever been known of Corsellis or the Oxford claim. There was, however, the date in the book; but a wrong imprint is not uncommon, and it is easy for a letter to drop out on its way to press. If an X is added the St. Jerome will be the first production in regular order of the Oxford press, being followed the next year by two books, one on Original Sin. The printers of these years are known. They were Theodoric Rood, a German from Cologne, and Thomas Hunte, an Englishman. Rood was alone till 1482, taking Hunte into partnership in that year. During the first eight years they printed fifteen books and used seven different kinds of type. One peculiarity about the St. Jerome is that the capital Q is always turned sidewise, as: . Later books use it correctly. Between 1486 and 1517 no books from Oxford are known. In 1517 John Scolar, a German, printed a few books, and continued through the next year, but stopped in 1519. Printing also ceased at about this time in Cambridge, York, Tavistock, St. Albans, Canterbury and Worcester, which Bagford attributes to Cardinal Wolsey's interference. In 1585 printing was resumed in Oxford. The Earl of Leicester presented a press, and the university made a grant of £100. Under Joseph Barnes, the first university printer, the press rapidly rose to prominence. It had much good Greek type from the beginning. A particularly splendid example of this character, which had appeared in an edition of St. Chrysostom at Eton in 1610–13, was added to the treasures of this printing-house soon after. It was of great primer size, with many ligatures. Archbishop Laud in 1633 gave direct encouragement to the press. In 1658 Dr. Samuel Clarke, the learned Orientalist, was appointed archi-typographus, and in 1667 Dr. John Fell presented a complete type-foundry. This is the person of whom the lines were written "I do not love thee, Dr. Fell," &c. In 1677 other gifts of type and matrices were made by Francis Junius. For the last two hundred years this press has been issuing works, many of them costly and some of a kind so unremunerative that they would have been printed nowhere else. The University Press at Oxford is a printing-office, a type-foundry and a publishing house. In the latter capacity it provided, in conjunction with the similar press at Cambridge, for the expenses attending the late revision of the Scriptures, and from these two offices was issued the first edition of that work. The standard of correctness and high accuracy in proof-reading, and the presentation of the learned side of printing there attained, have been accomplished more completely at Oxford and Cambridge than anywhere else in the English-speaking world, and all other printers are indebted to them on this account. It is a curious fact, as showing the conservatism both of Englishmen and printers, that this office is divided into two parts, one the Bible side and the other the Learned side, in which the types are not alike in length. They agree neither with each other nor with any other British standard. The Bible side height is slightly above the ordinary English height, but the Learned side height is about the same as the French height. The latter office is commonly known as the Clarendon Press, and the former as the University Press. Both are under the control of one person, Horace Hart. The building has a frontage of stone 250 feet in length, and there are two wings, each about 300 feet long. There is a fine entrance, adorned with Corinthian columns. This leads into a pleasant quadrangle, with green turf and fine old trees, and having in the centre a large fountain. The University Press makes its own paper, ink, type, stereotypes and electrotypes, and maintains a complete engineering establishment for making and repairing machinery. It owns three paper mills. Many platen machines (somewhat similar to the American Adams) are still used in its pressroom. Wetting down is done in a peculiar way. The paper is laid out in piles on a revolving table. There is a reservoir overhead, and a boy plays on each successive portion of paper with a hose having a sort of waterpot rose at one end. Sheets are dried on lines strung across rooms. Most work is executed in the Bible department from movable types, instead of from stereotypes or electrotypes. Consequently there is much material. One quarto Bible requires twenty tons of type. There is a font of Chinese, requiring about five thousand pounds. Steam-printing or machine-printing was introduced there in 1834. There are several other printing-offices in Oxford and a number of newspapers.

Oxford Corners.—Borders with mortised corners, thus: ✚.

P

P THE sixteenth letter in English. The capital and small letter bear much resemblance. It is not among those characters most used. In the lower case it is a descending letter, and when reversed does not differ greatly from a d except by having a serif extend completely across the long body mark, while in the d it is only found at one side. By apprentices it is easily mixed with q, which looks like p when seen in a looking-glass. It is supposed that the expression of minding your p's and q's comes from this. In Low Latin P signified according to Ugotion 100, but according to Baronius 7. In music p. signifies piano (softly). S. P. S. P. is an abbreviation for St. Peter and St. Paul, as on the Papal seals. On medals P. stands for various names of persons, places and qualities, as pater, populus, pius, perpetuus, pontifex, proconsul, &c.; P. P., pater patriæ; S. P. Q. R., Senatus Populusque Romanus; P. M., Pontifex Maximus; C. P., Constantinopolis. In speaking about books p. is an abbreviation for page, and pp. for pages; the latter is used in German as a sign for &c. The Arabians have no p, and neither have the Hebrews, who use a ph instead. On visiting-cards p. p. c., p. f. s. a., or p. d. a. are abbreviations for pour prendre congé, pour faire ses adieux, or pour dire adieu, and signify the taking of leave. L. P. in printing is an abbreviation for long primer; S. P. for small pica, and G. P. for great primer.

Pacchettista (Ital.).—A compositor who makes up type into pages.

Pacchetto (Ital.).—Lines made up together so that they may be taken off the compositor's galley. They are not pages, ready to go on the stone, but must be returned to the galley to be made up.

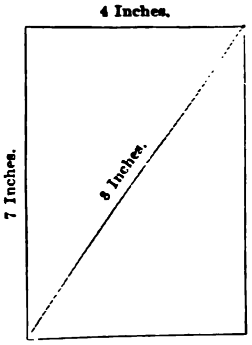
Pacchettoni (Ital.).—A certain number of packets or pacchetti joined together to be proved and corrected.

Packer.—The warehouseman specially told off for packing up work.—*Jacobi.*

Pad.—A quantity of paper of the same size, gummed or glued together at one, two or three sides, so that a perfectly flat, level surface may be used to write on, the sheet being then torn off. It has been much used to economize waste pieces of paper. It may be printed or unprinted.

Padeloup, Antoine Michel, a celebrated French binder, who between 1730 and 1759 produced a number of fine bindings which have never been surpassed in symmetry and elegance. He improved on both Boyer and Du Seuil by adding a number of small ornamental details, which have been imitated or copied by all of his successors.

Page.—One side of a leaf; the quantity of matter made up at one time, and which is encircled by margin on all sides. It consists of a folio or head-line, sometimes with reading and sometimes without, a blank-line, the text, and a blank-line which contains the signature whenever that occurs. If the folio has only the page number that figure is placed in the centre, but if it has a caption the latter takes its place, and the paging is at the right or left, as the page happens to be odd or even. The style most commonly followed for the heading for many years was to make use of small capitals, but Italic capitals of a smaller size are now much employed, as well as Italic lower-case letters capitalized of the same size as the text or sometimes larger. The blank-line beneath is the size of the text in ordinary work, but in some it is diminished. If the page is leaded a lead is inserted there also. Sometimes a brass rule passes across the page, but this has now become old fashioned. At the bottom of the page is the foot-line, consisting of quadrats of the same body that is used above, and with a lead between it and the other matter if that is leaded. The width of the page is as to the length, in most approved octavos, as 4 is to 7; but in duodecimos and quartos the width is greater in proportion to the length, being nearly as 3 to 5. Few pages are now made up double the length of the measure. Some offices have a rule that the hypothenuse of the page, or a line drawn from one corner diagonally to another corner, shall be the square root of the sums of the square of the base and altitude of the page. That is, if the page is four inches wide its length must be such that the line drawn from the corners diagonally opposite shall be eight inches long. This would make the problem, allowing a to be the width, or four inches; and b the hypothenuse, or eight inches, to find the value of x, or the length. If a^2 equals 16 and b^2 equals 64, as we find would be the case, the answer is that the length is the root of the difference between 16 and 64, or $\sqrt{48}$. This is as nearly as we can make it 7. Practically this is worked out in a printing-office by laying a lead at the end of the galley and then taking a number of leads of the same measurement, letting them rest against a cut, and pushing them down the galley a little distance. Take two leads of the same length, placing them end to end, having the same direction. Let the farther end of one touch the inner corner of the galley and the end of the other touch the outside of the first lead down the galley, and the proper length of the page is shown.



PAGE.

Page-Cord.—A particular kind of cord, of small size, used for tying up pages of type. It should be both strong and flexible, and in size should not exceed the twentieth of an inch in diameter.

Page-Gauge.—A piece of notched reglet used for making up pages to a uniform length.

Page Hangs.—When a form is badly locked up the corners of the pages get out of square and are said to hang.—*Jacobi.*

Page Paper.—Pieces of stiff paper or wrapper upon which pages of type are placed in order to release galleys.

Page Paire (Fr.).—Even page; la belle page, the odd page.

Página (Ital. and Sp.).—A page. In Italian, however, there is no accent.

Pagina Corta o Lunga (Ital.).—A short or long page.

Pagina Dispari (Ital.).—The first page of a signature; odd page.

Pagination.—The paging of a book.

Pagine Bianche (Ital.).—The pages which contain no characters.

Paging Ink.—A special ink made for paging or numbering machines.

Paging-Machines.—Mechanical apparatus for automatic numbering, used on blank-books or tickets.

Paginieren (Ger.).—To number the pages. To number leaves is called foliiren.

Painters' Etchings.—Etchings made by persons who are not professional engravers, the needle and aquafortis only being used.

Pair of Cases.—The two cases of type, upper and lower respectively, are said to be a pair.

Pale Color.—When the sheets are worked off with too little ink.

Palestina (Sp.).—Condensed antique letter. In Italy, body 24 of the Italian series, which is equal to a combined pica and English in our series.

Paleta (Sp.).—Palette, ink-knife.

Palimpsest, also **Codex Rescriptus.**—The name given to a parchment or other piece of writing material from which, after it had been written upon, the first writing was wholly or in part removed for the purpose of using the page for writing upon a second time. Many manuscripts of classical writers were thus treated during the Middle Ages. The text of some of these has since been recovered by washing or rubbing off the secondary writing and freshening up the original by chemicals, finally tracing it over with new ink.

Pallet.—The tool used for finishing across backs.

Pallet Knife.—An article used for taking ink from the can and for spreading it on the table, or for mixing purposes.

Palmear (Sp.).—To plane (a form).

Palmer, Frank W., the Public Printer at Washington, was born in Manchester, Dearborn County, Ind., on October 11, 1827. At the age of fourteen years he became an apprentice in the printing-office of Adolphus Fletcher, publisher of the Journal in Jamestown, Chautauqua County, N. Y.; served the full term of his apprenticeship; worked one year as a journeyman in the office of J. & E. Winchester, publishers of the New World, New York city; returned to Jamestown and served something more than a year in the double capacity of editor of the paper and foreman of the office; purchased a half interest in the paper, which he retained for a period of about ten years, meantime having editorial charge of the paper. In 1858 he sold his interest in the Journal establishment and removed to Dubuque, Ia., where in connection with E. P. Upham he became one of the owners of the Daily and Weekly Times of that city. In 1860 he was elected State Printer of Iowa, and in the spring of 1861 purchased the Iowa State Register, published at Des Moines, which, up to that time, had been issued only as a weekly. Mr. Palmer established a daily edition of that journal, which was continued thereafter. He was elected for four successive terms as State Printer, and in 1868 was elected as Representative in Congress from the Des Moines District. He served four years in that capacity, and in 1873 removed to Chicago, where he became one of the owners and editor-in-chief of the Inter Ocean of that city. In the spring of 1877 he was appointed by President Grant postmaster of Chicago, which office he held until June, 1885. In 1889 he was appointed Public Printer by President Harrison at Washington, D. C., and at this writing (April, 1893) is the incumbent of that office.

FRANK W. PALMER.

Palmer, Samuel, a printer of London, who brought out a History of Printing in quarto. He engaged to assist him in the historical part a man named Papiat, a broken Irish bookseller, of whom he had a great opinion. Papiat, however, did nothing except to delude Palmer with fair promises. He finally found he must get some one else, and George Psalmanazar, whose bold forgery of a History of Formosa, including a specimen of its language and the rules of its grammar, will forever render him notorious, took hold and finished it. In the meantime Palmer, who was to have written the practical part, went into bankruptcy and died, and that part of the book which Psalmanazar had written was brought out at the expense of the Earl of Pembroke. Palmer served his time with John Dunton, and it was in Palmer's office that Franklin worked for a while. His death was in 1732.

Palo (Sp..—Stem of a letter; de palo redondo, round or Scotch faced; de palo chupado, lean faced.

Palomillas (Sp.).—Brackets to support galleys, or for other purposes.

Palos de Cargar or **de Altura** (Sp.).—Bearers.

Palos de Imposición (Sp.).—Furniture (for imposition).

Pamphlet.—Any work which does not exceed five sheets, and which is usually done up in a paper wrapper. An extra charge on composition is involved for this class of work.—*Jacobi*. The preceding definition is according to the London usage, and would make a pamphlet, strictly considered, amount to no more than eighty pages; but in the United States the word has a much wider extent, and would include any unbound book which was tolerably thin, particularly if there was no intention of binding it. There is usually no extra charge for composition of such works in America, although from the loss of time in making them up and fitting the furniture there might very well be.

Panel.—1. The space between the bands in bookbinding. It is also applied to beveled and sunk sides. 2. In composition a design which is inclosed between four rules.

Paneling.—An effect produced by shapes or forms of wood worked under the leather in binding. A somewhat similar result is attained with stamps and dies.

Pantograph.—An instrument for drawing on a reduced or enlarged scale. The principle is that a lever touches at two points simultaneously, one with a short arm on an object if it is to be reproduced on an enlarged scale, while the long arm touches the replica. The converse is the practice if a large object is to be reproduced on a smaller scale. The end which is to make the reproduction has a knife or cutting instrument if a design is to be engraved; and it has a pen or pencil if it only copies a drawing. Of the former class is the machine used to cut wood-type. A type is properly secured in one place and a piece of wood, type high, in another. The edges of the letter are carefully traced at one end; at the other is a rotary-cutter or routing-machine, which cuts away all of the surface which is not needed.

Papa (Ital.).—"Dead horse." Work which has been paid for in anticipation, and consequently that from which the compositor can get nothing in the future.

Papel Picado (Sp.).—Stained or mildewed paper.

Paper.—A material usually manufactured in thin sheets, formed of vegetable fibre, and depending upon the quality of such fibres to felt or interlace themselves together. All vegetable fibres can be used for making paper, but those are the strongest which are least brittle and in which the interlacing is the most complete. Paper is manufactured most largely of linen or cotton rags, hemp, jute, esparto, straw and wood, alone or mixed with each other or with other substances, and by the differences in these materials, the bleaching and coloring substances and the method of making presents many appearances. It is employed in many arts, but its largest and best known use is as a material upon which to print and write. See Paper-Making.

Paper does not seem to have been known to the ancients, whose writings were upon parchment, vellum, papyrus and wax. Had the inhabitants of Europe in the Middle Ages been as solicitous about books and knowledge as were the Romans at the time of Augustus it would have been difficult to have obtained materials upon which to write. The papyrus which supplied the first approach to modern paper was an aquatic plant growing in Egypt, and paper made from it was manufactured in large quantities in that country. Herodotus, who lived nearly five hundred years before the Christian era, states that it was used as a material upon which to write long before his time. Some papyrus manuscripts have been found which appeared to be several thousand years old.

It is uncertain at what time paper as now known was first made. It probably came from the East. Dates have been assigned as early as 704 A. D., but it is undoubted that it was known in Europe before the invasion of England by William the Conquerer in 1066. Paper-mills were in operation in France, Germany and Italy by the year 1300. The Chinese and Japanese have had paper in use for many centuries. Paper was largely used for playing-cards a century before the invention of printing, and another use for it was found in the block-books, which preceded Gutenberg's invention by at least a quarter of a century. The improvement of printing caused a greatly increased demand for paper, and mills were started everywhere in Europe. The earliest calls for anything except printing and writing which caused an increased manufacture were those for wall-paper and for wrapping, both of which are still very large parts of the total product. Wrapping-paper preceded the other.

It is generally believed that a person named Tate built the first paper-mill in England at Dartford, in Kent, in 1498. Paper, however, was then made much better in Holland and France than in England, and so continued for two centuries. In 1660 official documents state that there was neither white writing-paper nor printing-paper manufactured in the kingdom. Brown paper was the chief paper produced. Within five years from the time when the manufacture of white paper was first regularly prosecuted in the mother country a mill was established in the American colonies.

Paper was first manufactured in America in the vicinity of Philadelphia. William Bradford, the printer, found a paper-maker among the immigrants to that city, and in conjunction with four of his neighbors established a paper-mill in Germantown, which the Rittenhouse family conducted for several generations. Bradford also established the second paper-mill, at Elizabethport, N. J. The first mill in New England was at Milton, on the Neponset River, in Massachusetts, a little below the head of tidewater. This was what is known as a tide-mill, power being gained from the head derived from the ebb and flow of the tide. On September 13, 1728, the General Court of Massachusetts granted to Daniel Henchman, Gillam Phillips, Benjamin Faneuil, Thomas Hancock and Henry Dering the privilege of erecting this mill. In the first fifteen months they were to make one hundred and forty reams of brown paper and sixty reams of printing-paper. In the third year they were to make writing-paper in addition.

Two other early American paper-mills were those in Delaware County, Pa., one built by Thomas Willcox, where the paper which was used by the Continental Congress in the manufacture of paper money was made, and the other by the Dunkards in Ephrata. The first mill in New York colony was at Roslyn, Hugh Gaine being concerned in it; and very soon after one was begun in the city of New York on land leased from Trinity Church. Franklin helped to establish about eighteen paper-mills. In 1769 there were in Pennsylvania, New Jersey and Delaware forty mills, manufacturing to the extent of one hundred thousand pounds annually. It will be remembered that paper was one of the articles upon which a duty was levied by Parliament, against which the colonists protested. Chlorine, which has rendered so important a service in the manufacture of paper, was discovered in 1774, and as soon as its availability was found out by paper-makers was immediately put to use, greatly increasing the whiteness of the product. All paper before this was dingy in color. In 1787 there were many mills everywhere. The ordinary size then was two vats each. Such a mill employed ten men and as many boys and girls. It required a capital of about ten thousand dollars, and could produce from two to three thousand reams annually, worth from three to three and a half dollars a ream. The size of the sheet of paper was about three-quarters of that of medium, or, say, 15 by 20. Large mills had four vats. The trituration of the rags for the pulp was performed by beating them in mortars or troughs, in which pestles or stampers were employed. These were superseded by the rag-engine or Hollander, so called, which was invented in Holland about the middle of the seventeenth century, and which is still employed in paper-making. The paper made in the earlier days of the industry was sent to market unbleached and uncalendered. Several days were required to produce a sample of dry, finished paper. The speed of working with the same number of help increased twenty-four times in the half century before 1849. It has, of course, been greatly augmented since then.

Since 1810, when Isaiah Thomas published his History of Printing, there have been available statistics of the growth of the American paper trade. In that year foreign paper was still imported, but the greatest proportion of paper consumed was made in the United States. There were twenty-one mills in the States of New Hampshire, Vermont, Rhode Island and Delaware alone, and ten in only five counties of New York and Maryland. Eleven of the mills had together a capital of $200,000 and 180 workmen, and made annually $150,000 worth of paper. Five years prior to this a dealer in paper appeared in New York; in 1812 there were two, and ten years later five or six. Before that time printers were obliged to hold large stocks of paper in the winter season. The consumption of paper in New York or Philadelphia in 1812, the two cities then being about equal in size, would not have exceeded one hundred small reams daily, each probably not weighing over eighteen pounds. There was very little variety in sizes, and there were only three common makes—a heavy wrapping paper, a thin paper in which to wrap up neat articles of attire or the choicer kinds of food, and a book or news paper. To this the letter-mills added a fourth, a hard, heavy paper, but with very little polish. In 1816 the first steam paper-mill went into operation at Pittsburg. It employed forty persons and turned out $30,000 worth of paper annually. In 1817 the first cylinder machine for making paper was put into operation. It was designed by Thomas Gilpin, and was employed in his mills on the Brandywine. The total manufacture in the

United States in 1820 was supposed to be worth about $3,000,000.

In 1825 the manufacture of paper by Fourdrinier machinery began at Springfield, Mass. Three years later the newspapers of the whole Union were estimated to consume 104,400 reams of paper yearly, worth $500,000, and those of New York 15,000 reams, worth four to five dollars a ream. The whole paper manufacture was estimated to have a value of $6,000,000, and to employ upwards of ten thousand persons. Large quantities of rags were imported from Germany and Italy. Straw paper began to be somewhat extensively used for wrapping in Philadelphia. It was also employed in printing Niles's Weekly Register, being regarded as the best and cheapest paper then made for that purpose. It was principally made at Chambersburg by machinery, and cost less than two dollars a ream, imperial size.

The production of paper in the United States of America in 1850 was valued at $10,187,177. There were 443 mills, having a capital of $7,260,864, and using materials to the value of $5,555,929. The number of male hands was 3,825, and of female hands 2,950. During the succeeding decade was first introduced largely and permanently for news purposes some other material than cotton rags. The Philadelphia Ledger was printed in 1858 on straw paper, and the Albany Evening Journal on the same kind of paper in 1856. Basswood had been used by Matthew Lyon in Vermont before the beginning of the century, and other mills occasionally tried other substances. Wood as a material for pulp was made the subject of a patent in 1830, and in 1854 Messrs. Watt & Burgess, of London, took out a patent in the United States. Successive improvements have brought up the product to a very high degree of excellence. While, however, straw was used largely at the time of the civil war, the extensive use of wood did not begin until after the close of the war. The total product of paper in 1860 was valued at $21,216,802. It is noteworthy that between 1840 and 1860 paper and pasteboard were used for making many articles which had before been made on a very small scale or else were unknown. Job printing, too, was almost entirely the creation of these years, and lithography was much extended, both requiring vast amounts of paper.

The earliest use of paper that we know of in the United States was in Cambridge, Mass., soon after Daye began printing. A Bible was there printed on pot paper, nearly equivalent to foolscap, and which was worth six shillings a ream. This at ten pounds to the ream would be fifteen cents a pound. The common price at the beginning of this century was from three to three and a half dollars a ream, these reams probably weighing from fifteen to eighteen pounds. This would be about twenty cents a pound. After the introduction of machinery book and news papers steadily fell in price, the latter being held in 1855 at eight cents a pound. Statistics are not available for the years after hand-paper went out until about 1850. When the civil war began values increased, as rags were difficult to obtain. Common news reached twenty-two cents a pound, book-paper thirty-five cents, and first-rate writing-paper cost sixty cents.

	1865.	1893.
Note Paper, first class	50 @ 53	14½ @ 16½
Note Paper, good	40 @ 45	12 @ 13½
Note Paper, common	33 @ 37	7½ @ 9½
Letter and Foolscaps, first class . .	47 @ 50	14 @ 16
Letter and Foolscaps, second class .	35 @ 37	11½ @ 13
Letter and Foolscaps, common . .	28 @ 33	7 @ 9
Common News, straw, &c.	16 @ ..	3 @ 3½
Good News, rag	18 @ 20	......
Fair White Book	22 @ 24	4 @ 5
Extra Book	26 @ 28	5½ @ 6
Sized and Calendered Book	29 @ 31	......
Extra Sized and Calendered Plate and Book	32 @ 35	6 @ 9
Manilla Wrapping	17 @ 20	3½ @ 4½

The differences between the prices then and now are very great. A table is given showing the prices in cents per pound of the most usual varieties on May 28, 1865, as corrected by Charles Magarge & Co., of Philadelphia, and on March 4, 1893, as corrected by the Paper Trade Journal. It will be noticed that some of the subdivisions do not correspond. There is now no straw news; manillas are at present made of excellent qualities, and sized and calendered book and extra sized and calendered book are now one and the same.

Paper is manufactured in various parts of the United States, but principally in the Eastern, Middle and Central Western States. The quantity of paper made in the United States has increased very rapidly. The number of firms engaged in the business has doubled since 1840, and the product has increased twenty-five fold, although the price is now much less than it was at that time. The figures given are partly from the United States census and partly gathered by Mr. Howard Lockwood. They are:

Year.	Firms.	Capital.	Hands.	Wages.	Product Value.
1840.	426	$4,745,239	4,726	......	$5,641,495
1850.	443	......	......	......	10,187,177
1860.	552	......	......	......	21,216,802
1870.	669	......	......	......	48,436,935
1872.	705	43,500,000	22,112	$10,000,000	66,475,825
1880.	774	49,488,852	26,904	9,501,030	60,161,261
				Output—Tons.	
1881.	769	......	......	600,000	62,500,000
1885.	868	......	......	850,000	85,000,000
1891.	867	......	......	1.650,000	124,000,000

The amount in 1872 was 317,000 tons. As given by Mr. Lockwood the trade is divided into twenty-two distinct classes, besides miscellaneous mills. The largest production is of book and news, which is about a quarter of the whole, and three-quarters as much is sold as wood pulp, which is used by the other paper-mills, besides the book and news mills. In this sense it is a raw product. Chemical fibre, also for this purpose a raw product, is about one-ninth of the whole. Straw fibre and palm fibre, although formerly made, were not manufactured in 1892. All of the fibres and pulps together furnished about 32 per cent. of the whole. Next to book and news, of the completed product, were manilla, strawboard, straw wrapping-paper, writing-paper, wrapping-paper, building, roofing and sheathing, hanging and curtain, wood-pulp board, card and colored. Of those chiefly used in printing, estimating book and news to be 100, writing would be 17, blotting 1¼ and card 12 per cent. It is well known, however, that the latter is very largely used in other occupations than printing. In book and news the increase since 1881 has been 204½ per cent., in blotting 361, in writing 131, and in cards 234½. The greatest quantity of paper is produced in New York, which furnishes a little less than a quarter; Massachusetts has a tenth, and next follow Maine, Pennsylvania and Ohio, closed by Wisconsin. These six States make 66 per cent. of all the paper produced in the United States.

There are many sizes and styles of paper used by printers, as well as some employed by those in other occupations. The most common kinds of printing-paper are book and news, map, card, colored or cover, enameled, surfaced, plate, envelope, writing and ledger, blotting, copying, carbon, tissue, manilla, wrapping, bond, parchment, and papers in combination, as pasteboard. Book-paper is the standard by which all other paper is measured, but is not used so largely in this country as news, that employed for newspapers. The difference between a low grade of one and a high grade of the other is little, and much book-paper is employed in printing newspapers. Generally, however, the latter are not calendered, a lower grade of material is used, and so much pains is not taken with the chemicals and the manipulation. The most ordinary size of book-paper is 24 by 38, which is also the most common in news; but in the latter 22 by 32, 28 by 42 and 33 by 46 are also much called for, the last usually being of greater weight to the area and better quality than the smaller sizes. In newspapers these sizes are chiefly determined by the number of columns of type on a page and the number of pages. The widths of these columns are from two inches to two and a half, but generally about two and a quarter. These being taken, with the thickness of the column rules added, gives the size of paper for width, and adding one-half more gives the length. They are three, four, five, six, seven and eight columns wide, and sometimes, but rarely, nine and ten. With the smallest eight pages will go on one side of the paper; with the five, six or seven column four pages, and with the greater ones two. In book and job work it is now a matter of pure fancy as to size on book-papers, and any manufacturer will make any size to order. Under DIMENSIONS OF PAPER all of these various sizes are given. Some paper is imported of qualities different from that here made. A rough and bulky book-paper is manufactured by hand at one place in America, and in many places abroad, costing from three to five times as much as ordinary book-paper. Flat newspaper is made as large as sixty or sixty-five inches wide, but web paper is made seven feet in width. It is not now common in America to call many of the sizes by any distinctive names, but they are known by their dimensions, and it is best always to order in this way. Fourdrinier paper is a name which defines the method of manufacture by the most improved machine. Papers thus made show equal strength when torn in any direction, and are thicker for their weight than cylinder papers. Cylinder paper is that made by a machine in which the fibres are laid by the machine always in the same direction. It tears or splits more readily in that direction.

Writing-paper is paper with a proportion of glue or sizing and of a smooth surface. The ink, without the size, would penetrate through the pores of the paper and render each line thicker than it should be. It sometimes has the same name, but it does not always match printing-papers in size. It is sold in many sizes, both flat and folded, and the commoner kinds can be found doubled and quadrupled, often of very great advantage in securing economy of work in printing. Wove paper is made without any watermarking or other impression than is made by the weave of wire-cloth or felt. Laid paper has a watermarking of equidistant parallel lines. Copperplate paper is one of the varieties of book-paper. It is unsized, is calendered on one side and rough and unfinished on the other. Plate paper is the highest grade of book stock and of equal finish on both sides. It is made both calendered and uncalendered. For the best wood-cut work the unsized is to be preferred. Map-paper is a thin, hard, sized paper of considerable toughness. Tinted or toned papers are made to order, of all sizes and kinds, but are usually to be found in stock only in cream color. It is best when using tinted papers to get at once enough and a little more than is required for a certain book, as a tint is difficult to duplicate. It costs a fraction more than plain white. Colored papers of the ordinary sort are used on posters, handbills and for much other work. Their colors are usually dull.

Enameled papers are painted or coated with a colored substance, which, of course, adds both to the weight and thickness. They are largely used for covers. Surfaced or coated paper is that which is coated with some substance to which a very smooth surface can be given. This is now much employed on the first-class magazines and on illustrated books. It increases the weight per ream and the price per pound. Tissue paper is very thin, often used in binding opposite to plates. Wrapping-papers are made from straw, manilla stocks and other substances. Immense quantities are used, but not by printers. Manilla paper is of all grades, some being very fine. Envelopes are made of all kinds of paper and of all colors. Hard writing-papers are to be preferred to soft writing-papers, and tub-sized and loft-dried papers are better than those not thus treated. Engine-sized paper is sized in the pulp. Plated paper is that which has been polished by pressure between metal plates. Cold-pressed paper has a hard and rough surface, and is very thick for its weight, receiving no calendering whatever. It is a difficult paper to write or print upon. Plain paper is that which is unruled. Perfect paper has been carefully inspected, sheet by sheet, and is free from specks, wrinkles and all imperfections. It is also known as the first sorting. M paper is that which is not up to the first sorting, but in which the imperfections are trivial, perceptible only to the expert. N paper is a much inferior quality, in which specks and wrinkles are more common. R or retree is another term for N paper. Casse paper, or outsides, is the imperfect paper usually found in the outside quires of folded writing-paper, and casse, cassie, or broken paper was once a common name for the two outside quires of each ream or bundle of book-paper, because they were frequently broken in transit and were always of inferior sheets. Off color is the term given to paper of gray, dull or unpleasing color. It is usually the result of accidental impurity in the water used in manufacture. Ledger papers are the best qualities of writing-paper, large in size. Bond papers are made of the finest writing-paper stock, with a special view to strength. They are usually uncalendered. Blotting-paper is an unsized and uncalendered paper, usually very thick, but sometimes thin. Copying-papers are used in copying-books, being thin and reasonably strong. Indian paper is used by engravers on wood. It is very thin and very difficult to break by folding. Carbon papers are employed in making copies by a stylus, and oiled paper is used to protect from moisture the unused leaves of a copying-book.

Much paper is converted into boxes. As thin paper would have very little strength, the kind used is very heavy, and in fact it is generally straw-board. The rough material is covered by finer paper or by cloth, and is scored, creased and bent as well as pasted by machinery. The paper-box industry is very large and employs many persons.

A profit should be obtained on paper by the printer as well as upon all of the other parts of his work. On small jobs, where the paper costs no more than ten or twenty dollars, an allowance of 25 per cent. would be justifiable, and from 5 to 10 per cent. even on quantities. When the customer furnishes the paper this cannot be done, but every expense connected with handling it should be reckoned. It is usually delivered on the sidewalk, and must be taken in; on much work it requires to be cut. If it is the printer's own paper there is a waste from torn and imperfect sheets and from spoiling on the press. Dry pressing and packing should be added, and if folding is done that should be included. The waste on short orders or on very particular work will always exceed 5 per cent.; on long orders and less particular work it may not exceed 3 or 4 per cent. Paper frequently cuts to waste. Thus a handbill 5 by 10 inches would waste paper on all sizes except 30 by 40, and that is procured with difficulty; on 24 by 38 a very large waste would occur. In orders received by the thousand full count ought always to be given or even a surplus, and that necessitates laying out more paper than is to be sent to the customer. Perhaps a thousand and fifty sheets will be necessary for one thousand perfected deliveries. When printing is done by the ream the loss from shortage falls on the customer. It is always well to consider whether economy of paper and presswork cannot be obtained by a different size of paper than might at first thought occur to the printer or customer. For instance, a 12mo can frequently be printed more easily as a 16mo, a little strip of paper on one side saving one-quarter of the presswork.

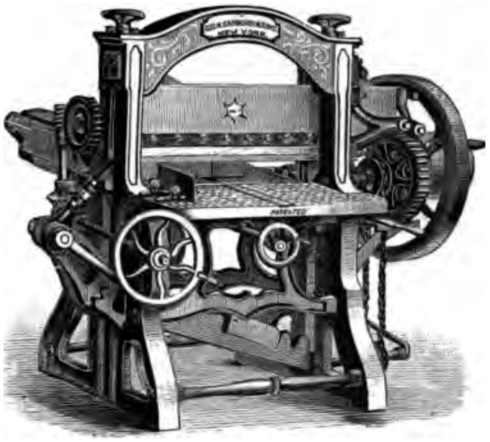
The proportionate weight of one paper to another is easily ascertained. A pamphlet printed on 24 by 38 paper, weighing forty-four pounds, is to be printed with the same weight for the same area on paper 22 by 32. The former sized paper has an area of 932 square inches; the latter of 704. Thus the result is found by the common rule of proportion—932 : 704 :: 44 : 33⅓. Paper 33 or 34 pounds would be substantially an equivalent.

Paper-Boards.—1. A term applied to cheap bindings in boards, but with paper instead of cloth sides. 2. Boards used in the wetting department between the different reams while in the screw-press.

Paper-Bench.—The standing bank or horse upon which paper is placed in the pressroom.

Paper-Cloth.—Paper made with a cloth face to permit it to be folded without breaking.

Paper-Cutter.—A machine for cutting paper. Much of the work in a job office is done upon small paper, although the sheets furnished by a dealer are, as a rule, large and must be divided. Occasionally, even on book or newspaper work, a part must be taken off the edge to adapt the paper to the necessities of the printing-office. In country offices this is particularly required, for the printer may often be miles from where paper is sold, and some demands are for very peculiar sizes. Thus a small quantity 30 by 40 might be wanted, and nothing nearer than 33 by 46 be at hand. A strip three inches wide would be taken from one side, and one six inches wide from the other. Paper-cutting machines are also used for squaring paper and for trimming its edges. Until a late period this cutting was done with a sharp knife, a small quantity being placed upon a table and a weight laid upon it, the man also leaning upon the paper with one hand if possible. This, however, was felt to be a slow and inaccurate process, and makers of binders' machinery in the three great Eastern cities each attempted to furnish something better. As originally constructed the paper-cutter consisted of a table, a framework of timber or metal over it, and a knife fitting in a groove. The knife was moved backward and forward by the hand, the paper being held by a clamp. This blade or knife was originally short, but it then became longer, extending the width of the table, and moved to and fro for a short distance. The power was given by the machinery. This was regarded in early days as a very good cutter. Most cutters now built are very massive and of great size. They are capable of cutting the largest sheets. The paper must be held with perfect steadiness while cutting is going on, and therefore a clamp, consisting of a plate upon the end of a large threaded screw, is moved rapidly down upon the paper, which it holds securely. Generally this is operated by hand, but sometimes it is started into motion by the first movement of the cutter and requires no other attention. Nearly all knives are now of the entire width and have a sliding motion at the same time that they descend. Ingenious contrivances regulate the knife, the paper, the return of the knife, the gauge and all of the other details.



STAR PAPER-CUTTER.

Paper to be cut should first be accurately piled up and the gauge set. If to be cut into half the top sheet should be carefully folded in the centre. To cut into thirds or fifths it is better to measure, as well as in all sizes smaller than fifths. Allowance must always be made for waste and for error. It would therefore be better if paper were to be cut into elevens to make the first cut so that three parts would be on one side and eight on the other. The cuts on the last can be determined by folding into halves at the top each time until four folds or eight parts are made, and then the other three can be divided. When the paper leaves a large margin the latter can frequently be utilized for other work. Two or more forms or jobs are often printed together and are then cut apart.

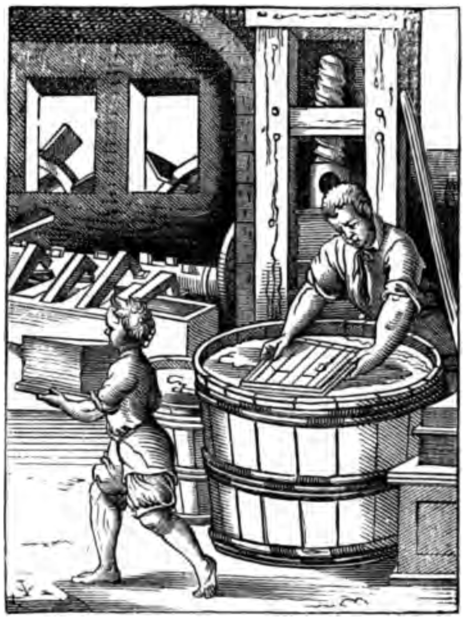
Paper Hangings.—See WALL-PAPER.

Paper-Knife.—A knife used in the warehouse for cutting up paper or for opening the edges of a book.

Paper Letters.—Type. Thus used in 1582.

Paper-Making.—The manufacture of paper consists in the combination of vegetable fibres reduced to a state of subdivision in water into a sheet. All kinds of vegetable fibres may be used in this combination; but some are of little value. In most cases the material is the refuse of other manufacturing processes or a by-product so inconsiderable in value as not to be desirable for other uses. Cellulose is the name given to vegetable fibres of any description when divested of all of the resinous or gummy substances, which are generally known as incrusting materials, and which serve to cement or bind the fibres together. Pure linen and cotton are good types of cellulose. As a chemical substance cellulose is white, translucent, somewhat heavier than water, tasteless, without odor, possessing no nutritive qualities and is not soluble in water, alcohol or oil. If boiled in dilute acid it is gradually converted into a substance known as hydro-cellulose. When boiled for a longer time in water under high pressure it is also changed.

The earlier forms of paper as known to us were made by hand, and this method of manufacture continues to this day, although on a comparatively limited scale, most of the product being now made on machines. Under the ancient system of making paper by hand the rags were washed in water and piled upon each other, being left in that condition until they became so tender that the fibres could be separated by the fingers. This practice frequently led to a loss of the material, because putrefaction would sometimes ensue in the decomposition of the heated rags. After the rags had become sufficiently tender they were beaten in a chest or trough by stampers until they were sufficiently separated and broken up into fibres of the requisite length. These stamps or beaters were afterwards superseded by the Hollander or beating-engine, which has continued in use to the present day. In making paper by hand the pulp is carried to what is known as a working-vat, which is a vessel made of wood or stone about five feet square and four feet deep, flaring at the top. The pulp being mixed therein with water is heated by means of a steam-pipe located in the vat, an agitator being provided therein for the purpose of uniformly mixing the pulp and water by keeping the contents of the vat in motion. The mold for making the paper consists of a wooden frame with wooden bars running across about an inch and a half apart flush with the top edge of the frame. Upon these bars, lengthwise of the frame, are laid wires, fifteen or twenty to the inch, parallel to each other. The deckel, which is a movable frame made to fit very neatly upon the mold, forms with the latter a kind of shallow tray with a wire bottom resembling a sieve. The paper manufactured in the mold as thus constructed is called "wove" paper. When, however, coarser wires are laid at equidistant intervals —say an inch apart—transversely of the wires which form the bottom of the mold, the paper made thereon receives the watermark or impression of the cross wires and thereby acquires the name of "laid" paper. The vatman dipping the mold into the vat containing the fluid pulp takes up as much of the latter as is necessary to form a sheet of paper. Great dexterity is a feature of this process, the skill of eye and hand, acquired by experience, serving the workman to make a perfect sheet of paper and to succeed this with other sheets equally perfect and of even weight. A peculiar shaking motion is given to the mold to cause the proper intermixture or interweaving of the fibres so as to secure uniformity of texture. After the sheet is thus formed the deckel is taken off and the mold is slid along a small shelf to an assistant known as a coucher, who, taking the mold, turns it upside down on a piece of felt upon which he deposits the newly made sheet, and then, removing the mold, places another piece of felt upon the sheet, and this is continued until six or eight quires are in the pile, which is then placed in a standing-press, where it is subjected to great pressure. When this pressure is relaxed the felts are taken out by the layer, who separates them into one pile and the sheets of paper into another. The paper is again pressed by itself to remove the felt marks and remaining moisture as far as possible, after which the sheets of paper are separated, again pressed and then transferred to a loft to dry. After drying the paper is taken down and laid neatly in heaps to be sized. The size is made of pieces of skin cut off by the curriers before tanning, or sheep's feet or any other matter containing much gelatine. These substances are boiled in a copper to a jelly, to which, when strained, a small quantity of alum is added. The workman then takes several quires of paper and spreads the sheets out in the tub containing the size properly diluted with water, taking care that they shall be equally moistened. After sizing the superfluous size is pressed out and the paper is parted into sheets. After being once more pressed it is placed in the drying-room, where it is dried slowly. When the paper is thoroughly dry it is carried to the finishing-house, and is again pressed pretty hard. It is then looked over by women, who with small knives take out the knots and imperfections and separate the perfect from the imperfect sheets. The paper is again pressed, given to the finisher to be counted into reams and done up. These reams, being pressed and tied up, are sent to the warehouse for sale. A good finisher can count two hundred reams or 96,000 sheets in a day.



EARLY PAPER-MILL.

Paper-making is carried on in some towns of the Old World just as it was five hundred years ago. At Amalfi in Italy there are seven ancient mills in which rags are beaten by hammers. Only one of these has a beating-engine.

At present nearly all paper is made by machinery. The theory of its manufacture is the same as that of hand-made paper, but each of the operations is performed on a much larger scale. Rags no longer furnish the principal portion of the raw material, but many substances, obtained more easily and cheaply, are employed instead. Wood, esparto, straw, jute, hemp, waste paper, &c., are other materials most in vogue, some of these being employed after they have served their purpose in another capacity, old rope, bagging, waste of cotton and linen being among the kinds of "stock" used by paper-makers. The manufacture of paper begins with the first process required to put these materials into shape. In making wood pulp it begins with cutting the log into billets, which are then put in contact with the periphery of a grindstone contained in a machine known as a wood-pulp grinder, and which tears off the fibres. In the manufacture of wood fibre the pulp wood is cut into chips or small disks and is then boiled in an alkaline or acid solution in a closed vessel known as a digester, the chemicals in the solution separating the fibre from the incrusting substances, which are dissolved in and carried off by the spent liquor when the digester is emptied. Esparto or Spanish grass is cleaned and sorted by hand on sorting-tables, and is then boiled in an alkaline solution. Straw is steeped in milk of lime and then boiled, or after cleaning it is cut into short lengths and placed in a digester in which it is boiled with a solution of caustic soda. The butt ends of jute and all other fibres of the plant unavailable for spinning purposes are utilized for paper. This stock is boiled with solutions of alkali in rotary boilers. Hemp, generally the product known as manilla in the form of old rope and worn-out bagging, follows the same course as jute. Waste paper is dusted, sorted and boiled in alkaline solutions, preferably in stationary tubs. Cotton and linen waste are passed through cutters, then through threshers, after which they are boiled with a solution of caustic soda in rotary boilers. After the preliminary preparation for each class of stock the pulping and manufacture into paper is conducted upon the same general principle or exactly the same as when rags are used. This being the case the method of converting rags into paper on the machine will be described.

The method of making paper from rags consists in first breaking the bales and putting the rags in a thresher or dusting-machine. After passing through the rags are sorted by hand, women being employed for this purpose. In separating all buttons, hooks and eyes, pieces of metal, bone, india-rubber or leather are removed, and seams, hems and knots are loosened. These women cut the rags into small pieces. Standing before a large-bladed knife, which has its back towards her, the sorter draws the cloth against it. Her table or box is covered

ire-cloth, so that dust can fall below. Machine-
; is used for the more common qualities of paper.
ıy mills the cut rags are passed through several
, that is, first through a devil or railroad duster
en through an open cylinder duster, and are fin-
livered at or near openings in the floor of the
m, underneath which the mouths or manholes of
oilers called rotaries are brought. The rags be-
ed into the boilers, in which a solution of soda
ustic soda or lime in water has been placed, the
le openings in the rotaries are closed, steam is in-
ed to the interior through the journals on which
lers rotate, and the rags are boiled under pressure
eral hours. The object of boiling is to extract
roy the fatty, glutinous and coloring substances
surround the pure fibre. After the rags have
oiled for the necessary length of time the rotation
boilers is stopped at the point where the manholes
ned towards the floor of the boiler-room, so that
he manholes are opened the rags are discharged
drainer bottom beneath the boilers. After being
scharged the rags are conveyed in trucks to the
g and beating engines. The rags may be first
l in one engine and then beaten in another, or the
of preparing the pulp may be carried out in the
nachine. This engine (so called) is an oblong
vat, with circular ends, divided lengthways by a
m called the midfeather, which runs half of the

On one side is an iron cylinder or roll on the
which are set at equidistant intervals steel bars
es fastened parallel with the shaft. Another set
es is fixed rigidly on the bottom of the tub direct-
r the roll, so that the edges of both sets of knives
d almost touch each other. The rags with a suf-
quantity of water having been placed in the tub,
is applied to the shaft carrying the roll; the lat-
turn rotates and by its action creates a current
ıg the rags successively under it, where they are
ıpon by the two sets of knives described and grad-
educed to a state of subdivision. The washing-
has one or two cylinder washers, which are low-
to and partially submerged in the mass of stock
ised when their work is completed; these are
or octagonal cylinders of framework covered with
ıuze. They revolve, causing a current in the fluid
ı; a certain portion of the dirty water, however,
into the cylinder. At the end of this cylinder is
et for the escape of this water, while in another
n the engine a continual supply of fresh water is
d. Thus the rinsing is continually going on, and
end of from three to five hours the stock is suffi-
cleansed. The roll is covered with a box, so that
s of the rags shall not be thrown out and the
pilled on the floor. During these operations the
ve become much disintegrated, and they are now
as half-stuff.

hing is the next operation. This is accomplished
ing to the half-stuff a solution of chloride of
nd later a small portion of sulphuric acid, which
ns the action of the chlorine. The half-stuff is
d into a chest or drainer below by raising a valve.
ainer will contain many times the quantity of
at an engine does, and here the bleaching process
luded. After the bleaching the pulp must be
l to free it from the chlorine and other chemical
ts adhering to it. For this purpose it is again
rough the engine, the roll of which is raised to
utting the fibre. When the washing is complete
is lowered and the stock is beaten to the required
s and is afterwards sent to the stuff-chest. This
on completes the preparation for actual paper-
. What follows is the supply of the fibre to the
e and its change into a firm, even sheet.

materials used in this manufacture differ largely
r availability. Those which interlace or felt to-
most easily and firmly are the best. These are round, ribbed fibres, such as hemp and flax; smooth or feebly ribbed fibres, as esparto, jute, New Zealand flax, dwarf palm, hop and sugar cane; fibro-cellular substances, like the pulp obtained from the straw of wheat and rye by the action of caustic lye; flat fibres, as cotton and those obtained by the action of caustic lye upon wood, and imperfect substances, as the pulp obtained from sawdust. Long, flexible, elastic fibres, even though comparatively smooth in their exterior, intertwine readily and felt into a strong, tough sheet. Cotton fibre is long and tubular, and when dry the tubes collapse and twist on their axis, which adds much to their availability in paper-making. The filaments of linen are jointed like the sugar cane, and these joints add much to their strength. The fibre of straw is short, pointed and polished, and cannot of itself make a strong paper. Wood fibre differs very much. Yellow pine has a long, soft and flexible fibre, much like cotton, but oak and other woods have short circular fibres which possess no flexibility. Very short fibres make very weak paper.

The stuff-chest being filled with water and constantly agitated, the pulp, which is then clean and free from any chemical admixture, is pumped into a regulating-box or supply-box by means of a pump called the stuff-pump. Through this a regular supply of pulp is furnished to the machine. A sand-trap acts as a receptacle for sand or grit. When the stuff reaches the Fourdrinier machine it does so through a pipe containing a stream of water which flows rapidly. After passing through the screens and other preliminary parts the pulp is deposited upon a wire-cloth, which has both a forward and a lateral motion. It is a huge belt upon which the pulp is deposited evenly, still in a liquid condition. The water oozes out through the bottom and falls into a depression below, from which the minute particles are afterwards extracted as they flow away. The wire-cloth is constantly vibrated by means of a shake attachment by which some of the fibres are thrown athwart the machine, while the lay of fibre in the other direction is accomplished by the motion or travel of the wire-cloth. This cloth is supported for its whole distance by small rollers placed pretty closely together. The fabric is thin, the wires are small, and it is essential that the mold shall be level. The pulp is prevented from spreading beyond the edges of the wire by endless rubber bands or straps, known as deckels, which run on each side on top of the wire, and thus determine the form or width of the paper. They continue about two-thirds the distance of the run of the wire-cloth, by which time the paper is formed, although still in a wet and pulpy condition. At this point is placed the dandy-roll, a cylindrical frame covered with wire-cloth, which, running on the pulpy paper, presses the fibres more closely together. Upon this dandy-roll are frequently letters, monograms or pictorial designs, which can be seen in the perfected paper by holding it up to the light. This is generally accomplished by having some of the wires project a little more than usual, or by fastening other wires over them, thus causing the paper to be a little thinner in those places, but lately in some places the wires have been depressed where the design occurs, thus making the paper thicker against it. The web then passes over the suction-boxes by which air and, of course, water are drawn through by a suction-pump. The next operation just as the paper leaves the wire-cloth is to pass it under the couch-rolls, from which it goes to the first press or set of rolls which squeezes out more moisture, and thence to the second press. By this time the web has become comparatively free from moisture, has acquired some tenacity, and needs to have its remaining moisture expelled by heat. Up to this point no heat has been used.

After leaving the second press the paper passes to the dryers, a series of iron cylinders heated by steam; these are two and a half to three feet in diameter, and many of them are used. The web, always accompanied with a felt or belt of duck, passes over and under these cylinders, receiving heat from each of them and becoming drier and more compact as it reaches the end of the machine. It is a true paper before it touches any one of these cylinders, but by its passage between them loses the moisture which formerly took five days to dissipate by the method of hanging up to dry. When it has passed through all of these cylinders it enters a series of polished iron rolls, known as calenders, to give the paper a surface. They are pressed together by screws or levers and weights. Leaving these rolls the paper is wound on reels and from thence goes to the cutters, where it is cut into sheets and afterwards supercalendered if needed. When the paper is wanted in rolls it is carried through to a shaft upon which it is wound without being cut. The paper-making machine thus roughly described is the FOURDRINIER MACHINE (which see), invented in France just before the beginning of the present century, and justly regarded as a marvel of ingenuity and painstaking. It has since been much improved in all of its details, but is in theory substantially the same as when first brought out. A cheaper machine is the cylinder machine in which there is no lateral motion to the wire-cloth; consequently the paper felts only one way. It is stronger in the direction of its length than the paper made by the Fourdrinier machine, but weaker the other way, the felting being well accomplished in one direction only. In this a hollow cylinder, covered with a wire web, rotates in a vat containing the pulp, which is deposited on the surface of the cylinder as it emerges from the fluid contents of the vat. This kind of machine is extensively used in the United States for making wrapping-papers, straw and binders' boards, and hanging papers. When sized papers are made the pulp is sized in the engines, a vegetable size being used. Animal sizing is done on the machine, the web passing through a trough in which a solution of gelatine is placed.

Paper is supercalendered by passing it between a series of rolls, some of which are of chilled iron, while the others are made of sheets of paper or disks of cotton placed on an iron shaft, then compressed until they form a compact mass, after which they are turned off like iron. The paper, cut into sheets, is fed sheet by sheet into the supercalenders, being guided by devices which carry it through the series of rolls, until at length it is deposited in a box where it is sorted by an operative. Sheet calenders are only necessary where the paper has been sized on the surface and dried in sheets; if it has been sized in the engine or on the machine and dried in the web it can be glazed in web calenders, put up into bundles and frames and sold. This method is followed if the product is ordinary news. Paper is loaded or filled with other substances to fill up the pores and interstices. Part of this is done to make the paper appear more solid or to make it heavier, and part of it is to give a better surface. The loading material for ordinary qualities is kaolin or China clay, and for the better qualities sulphate of lime or pearl hardening. The quality of clay used on the best book-paper designed for illustrations is very good. No matter how much care is exercised in the manufacture of paper there are little ridges and hollows upon its surface, similar to those found upon the rind of an orange. By surface-coating the paper it is made much smoother, and a wood-cut can be printed with the greatest delicacy. The clay is worked up into a thin cream with water, and then flows into the pulp when in the beating-engine. In surfaced papers the mixture is applied by brushes or rollers, and scraped and rolled smooth by other brushes and rollers. Paper is given a color or tint by placing in the pulp in the engine some coloring substance which dissolves very slowly; by adding a colored liquid; by using rags which are already colored, and by employing two substances which in mixture give the shade required. Blue is used considerably in writing-papers, and a buff in many printing-papers. It is very desirable to have the same paper always of the same color, but nature, while providing us with the raw materials, does not enable us to make pure white paper from them. Paper in practice always inclines to blue or yellow, and it is considered expedient to keep each product shaded a little either one way or the other. This can be accomplished by a little coloring matter. It is difficult to tell whether a shade of buff does not vary from another shade of the same color, but it is quite easy to tell whether a buff or bluish tint prevails.

The largest amount of paper is now made from wood. Until about 1855 no substance other than linen and cotton rags was used, except in rare instances, for news and book paper. The successive changes have brought wood to the front, and most of the ordinary grades of paper are now manufactured from this material, which does not seem likely soon to be dislodged, as it is difficult to see how anything can be cheaper or more easily handled. There is no calling in which more ingenuity has been exhibited than that of paper-making; but the character of the manufacture is such that the different processes, while sufficiently different for the expert to recognize readily, cannot be explained to the general reader without lengthy description, for which there is not space.

Paper-Molding.—Stereotype molding by the paper or patent process.

Paper Process.—Stereotyping by means of paper molds, called the new or patent process—distinct from plaster process.—*Jacobi*. The paper process is used in the United States for very little besides newspapers, as so much more clearness and sharpness can be obtained by electrotyping that there is no comparison between the two.

Paper the Case.—Lining the bottoms of cases; usually done now by the manufacturers before the bottom of the case is fastened on. The paper used is thin but tough, and prevents letters from sliding under the partitions.

Paper Up.—To tie up in paper sorts or type temporarily out of use. It is the general custom, and in offices of ordinary size the best custom, to take the leads from between the lines, to distribute the heads and blank-lines, as well as those which contain ornamental type or an undue proportion of unusual sorts, and then to tie up the page, afterwards wrapping it in paper. The pages are piled upon each other. In some large offices the leads are left in.

Papering Up.—Covering the edges of a book after they are gilt to protect them while the volume is being covered and finished.

Papeterie.—A box, plain or ornamental, filled with paper and envelopes to match. This is its signification in the stationery trade of the United States, but the word in French means paper ware or made of paper, as well as a paper-mill.

Papier (Fr. and Ger.).—Paper; geglättetes papier, glazed or calendered paper.

Papier Ingres.—A French hand-made paper used for drawing purposes.

Papier-Maché.—Mashed paper; a composition of paper cuttings boiled in water and beaten to a pulp, which is hardened by glue or size until it is exceedingly tenacious, then being used as material for ornamental articles of household furniture, portfolios, &c. In the system of stereotyping known as the papier-maché process a combination of blotting and tissue paper is employed in making the matrix.

Papiers Incassables (Fr.).—Tough paper, used for maps; literally, unbreakable paper.

Pappe (Ger.).—Cardboard.

Papyrograph.—A small mechanical apparatus for duplicating letters, &c., first written by hand with a chemical ink upon a prepared substance. From this material a large number of copies can be taken.

yrus.—A kind of reed formerly cultivated in
It was grown in the delta or Lower Egypt,
longer exists there, although still found in some
elsewhere. The plant itself is the paper rush, or
us antiquorum, called berd by the modern Egyp-
distinguished by its tall prismatic or triangular
pering stem, growing to the height of about ten
urmounted by a downy flower. It appears to have
bundant in Egypt at the early period of the fourth
y. On monuments of the reign of Chephren and
s men are represented bearing bundles of this plant
they have gathered, or forming it into the light
by which they crossed the marshes or the Nile.
rincipal site of its cultivation was the alluvial
where it is represented reaching the height of
t in the delta. As early as the fifth dynasty it
s in the hieroglyphics; but as the plant has grad-
lisappeared from Egypt some naturalists have
ed that it was not indigenous, but introduced
the Niger or Euphrates, where it is still found
, and that it has become extinct for want of neces-
lture. It has, however, been seen as late as the
nth century on the borders of Lake Menzaleh, in
Egypt and in Abyssinia. Some think, indeed,
e term papyrus comprehended two or three dif-
kinds of reeds, such as the Cyperus dives, which
cultivated in Egypt, and that the disappearance
Cyperus papyrus is due to the monopoly of the
contractors or publicani, who restricted its cul-
a few localities. According to Pliny it grew ten
ove and two in the water, besides striking deep
nto the Nilotic mud in the pools or marshes. The
us was one of those plants which the ancients
ted to a multitude of uses. Its elegant and light
were woven into crowns; its pith or pulp was
and eaten and considered the primitive food of
; the root, on the contrary, was dried and used
l; the bark was manufactured into matting, sails
pes, bedding and clothes. The priests used it only
dals, and sandals of it remain to the present day
collections of the British Museum. Boxes were
ade of its stems, trimmed and tied at the ends and
; and in an ark or box of papyrus the youthful
was placed among the standing pools of papyri.
time of Homer it was used by the Greeks for
g, and Antigonus used for the cables of his fleet
s grown in Syria. The ancient Greek name for
terial was bublos, but it was not applied by prose
to books. The most remarkable use of this plant
r the manufacture of paper, tama, which appears
hands of scribes on the earliest monuments in
sheets or long scrolls. The process of manufac-
s described by Pliny, was to cut off both ends of
nt. The portion used was neither the outer bark
inner pith, but some twenty layers or pellicles un-
rind surrounding the triangular stalk, those near-
centre being the finest, which were separated by a
. These were laid side by side upon a board, and
ayers were placed at right angles on them so as
er them, and the whole was cemented with Nile
or more probably with a fine glue. By continu-
s process it was possible to make the piece of any
and breadth required; and the whole was pressed,
with a hammer and rubbed with a tooth or shell.
then pared, smoothed, laid in the sun, bound to-
and rolled out. The size and quality of this paper
considerably, the greatest breadth of the sheets
one foot six inches, or the lesser cubit; but some
are not more than four inches, while the quality
from a coarse and stringy to a silky material re-
bly fine and smooth. The length was, of course,
ry, the longest pieces, such as the hieroglyphical
at Leyden, measuring sixty feet, while other por-
o not exceed a few inches. The darkness of color
ably owing to the greater age, those of the oldest
being generally the darkest and almost of a sienna color, the material having carbonized with age, while the later are generally, though not always white; but there can be no doubt that the contact of the rituals with the hot bitumen of the mummies has in many instances rendered the color darker; the hieratic historical papyri, said to have been found in vases, are, however, extremely dark. Papyri are found under various circumstances, but principally in connection with the mummies, as in their hands, under their arms, between their legs or under the bandages stretched all over them like a shroud. They are generally, however, of a cylindrical form rolled upon themselves, the first page, of course, being outwards, and those of letters are sealed with a clay seal. The rituals are often placed in wooden cases made in the shape of Osiris hidden in niches made for that purpose, or in the hollowed body of the deity, or else in a niche in the pedestal so skillfully covered, joined and painted as to elude detection by the eye. The historical and documentary papyri are said to be found in vases, boxes and coffins.

The ink with which the Egyptians wrote on this material was an animal carbon, apparently mixed with oil. They used for the purpose a long rectangular palette or canon, having two small cells or hollows which held a small quantity of red and black ink. The pens used were a thin, cylindrical and fibrous reed, the ends of which when split form a kind of natural brush. The writing is according to the nature of the document; the hieroglyphical in vertical lines of thin linear hieroglyphs, the hieratic and demotic in broader and thicker characters, generally about ten lines to a page of nine or eleven inches long, and in black and red characters. Compositions of the nature of books are written with great care and regularity; official documents with less care and with characters of larger dimensions at the commencement. The religious compositions are ornamented with pictures or vignettes, traced with great delicacy, and sometimes brilliantly colored with simple colors and even gilded.

Paquet (Fr.).—A packet, a piece of matter tied up. On the Continent of Europe it is common for the compositor to empty directly upon a galley laid on his case. If the type is large or the measure narrow the galley soon becomes full. A certain portion of the matter, without regard to the length, is then tied up and put one side. It is not a page or an even fraction of a page; it may be much more or much less. It is simply some type tied up temporarily to await convenience for imposition and proving.

Paquete (Sp.).—Package; a piece of composed matter when tied up.

Paquetero (Sp.).—Stand or cabinet for holding the pages or packages of type; also piece compositor, or one who sets only straight matter.

Paquetier (Fr.).—One who makes up into pages, ties up the matter and puts it away.

Par.—Abbreviation used in the reading department of an English office for the words parenthesis or paragraph.

Paragon.—The size of type next larger than great primer, and next smaller than double small pica. It is only used as display letter, being too large for books. About three and a half lines make an inch. On the point system it is calculated at twenty points. This type, Hansard remarks, is the only one known under the same name in all countries. In French, however, it is entitled petit parangon (little paragon), to distinguish it from the next size larger, which is called gros parangon. The Italians call it parangone.

Paragrafo (Ital.).—A section mark, or §. It will be noticed that this does not correspond at all to the English name.

Paragraph.—A verse; the matter contained between one break-line and the next. No exact rules exist to show when a new paragraph should be begun. The plan generally adopted is to begin one when the sense changes. This is, however, very much at the will of the author or printer. A paragraph is usually indented an em quadrat. This is sufficient when the measure does not exceed twenty-five or thirty ems of the type used; but if the measure goes much beyond this it is better to employ two ems, and in very long ones three ems. In some good leaded work matter even narrower than thirty ems is indented an em and an en. Much must be left to authors in the making of paragraphs. Some desire a great number, and others prefer long ones. In conversation it is usual to break up the matter into paragraphs for each new speaker and for each interruption. Paragraphs should not end with two or three letters, even if a whole word, and in books designed for permanence at least an eighth of the blank-line should be filled up with the last words of the paragraph. The last line of a paragraph should not come at the head of a page. An even paragraph is where a bit of copy is given to a compositor and he is told to begin and end even. Thus he makes no indentation and spaces the last line so that the last word of his take completely fills it out. A hanging paragraph is where the first line begins flush and the second and succeeding lines are indented. A mark for authors or editors to indicate a paragraph is ¶, and when it is desired that no paragraph shall be made a line runs from the end of one paragraph to the beginning of the next. It is also denoted by "No ¶." In some books and magazines the first word of a chapter or instalment is not indented, but runs out flush.

Paragraph Mark.—The paragraph was formerly prefixed to such matter as authors desired to distinguish from the ordinary contents of their books, and to give their readers an idea of the beginning or some important division of a new subject. At present paragraph marks are used chiefly in Bibles to show the parts into which a chapter is divided. In Common Prayer-Books paragraphs are put before the matter which directs the order of the service, and which is called the Rubric, because the lines were formerly printed in red. The paragraph mark is the sixth and last in order of the usual reference marks, following the parallel, and is thus shown: ¶.

Parallel.—A reference mark for foot-notes, indicated thus: ‖.

Parangona (Sp.).—Great primer or eighteen points. Previous to the adoption of the Didot system this was the standard body, as pica or Cicéro is now.

Parangonaje (Sp.).—Justification together of letters of different bodies.

Parangonar (Sp.).—To justify letters of different bodies in one line.

Parangonare (Ital.).—To justify one body in with another or with several others.

Parangone (Ital.).—Body eighteen of the Italian series. It is nearly as large as the paragon, which is body twenty of the American series.

Parchment (Fr., parchemin; Ger., Pergament).—A writing material formed from skins, so prepared that they are as thin, smooth and white as possible. It has been known from the earliest time, but is now made very superior to what it was anciently, if we may judge by inspection of old manuscripts. The art of making parchment consists in certain manipulations necessary to make the skins of animals of such thinness, flexibility and firmness as may be required for the different articles in which this substance is needed. Although the skins of all animals may be applied to this use only those of the sheep or the she-goat are used for parchment; those of calves, kids and dead-born lambs for vellum; those of the he-goat, she-goat and wolves for drumheads, and those of the ass for battledores. All of these skins are prepared in the same way, with slight variations, which need no particular detail.

They are first of all prepared by the leather-dresser. After they are taken out of the lime-pit, shaved and well washed, they must be set to dry in such a way as to prevent their puckering and to render them readily worked. The small manufacturers make use of hoops for this purpose, but the greater employ a herse or stout wooden frame. This is formed of two uprights and two crossbars solidly joined by tenons and mortises so as to form a strong piece of carpentry, which is fixed against a wall. These four bars are perforated all over with a series of holes of such dimensions as to receive slightly tapered boxwood pins truly turned, or even iron bolts. Each of these pins is pierced through with a hole like the pin of a violin, by means of which the strings used in stretching the skin may be tightened. Above the herse a shelf is placed for receiving the tools which the workman needs to have always at hand. In order to stretch the skin upon the frame larger or smaller skewers are employed, according as a greater or smaller piece of it is to be laid hold of. Six holes are made in a straight line to receive the larger, and four to receive the smaller skewers or pins. These small slits are made with a tool like a carpenter's chisel and of the exact size to admit the skewer. The string around the skewer is affixed to one of the bolts on the frame, which are turned around by means of a key like that by which harps and pianos are tuned. The skewer is threaded through the skin while the latter is in a state of tension.

Everything being thus prepared, and the skin well softened, the workman stretches it powerfully by means of the skewers; he attaches the cord to the skewers and fixes their ends to the iron pegs or pins. He then stretches the skin, first with his hand applied to the pins, and then with the key. Great care must be taken that no wrinkles are formed. The skin is usually stretched more in length than in breadth, from the custom of the trade; although extension in breadth would be preferable in order to reduce the thickness of that part of the skin which lies against the backbone of the animal. The workman then takes the fleshing tool, a semicircular double-edged knife fastened into a double wooden handle. It is sharpened by a steel. The workman seizes a tool in his two hands, so as to place the edge perpendicularly to the skin, and pressing it carefully from above downwards removes the fleshy excrescences and lays them aside for making glue. He then turns around the herse upon the wall in order to gain access to the outside of the skin and to scrape it with the tool inverted so as to run no risk of cutting the epidermis. He thus removes any adherent filth and squeezes out some water. The skin must next be ground. For this purpose it is sprinkled upon the fleshy side with sifted chalk or slaked lime, and then rubbed in all directions with a piece of pumice-stone four or five inches in area, previously flattened upon a sandstone. The lime soon gets moist from the water contained in the skin. The pumice-stone is then rubbed over the other side of the skin, but without chalk or lime. This operation is necessary only for the best vellum or parchment. The skin is next allowed to dry upon the frame, being carefully protected from sunshine and from frost. When it is perfectly dry the white color is to be removed by rubbing it with the woolly side of a lamb-skin. Great care must be taken not to fray the surface, a circumstance of which some manufacturers are so much afraid as not to use either chalk or lime in the polishing. Should any grease be detected upon it this must be removed by steeping it in a lime-pit for ten days, then stretching it anew upon the herse, after which it is transferred to the scraper. The workman employs here an edge tool of the same shape as the fleshing-knife, but larger and sharper. He mounts the skin upon a frame like the herse above described, but he extends it merely with cords without skewers or pins, and supports it generally upon a piece of raw calf-skin strongly stretched. The tail of the skin being placed towards the bottom of the frame, the workman first pares off with a sharp knife

onsiderable roughnesses and then scrapes the out-
urface obliquely downwards with the proper tools
t becomes perfectly smooth. The fleshy side needs
ch operation, and indeed were both sides scraped
in would be apt to become too thin, the only object
scraper being to equalize its thickness. What-
rregularities remain may be removed with a piece
finest pumice-stone well flattened beforehand upon
sandstone. This process is performed by laying
ugh parchment upon an oblong plank of wood in
rm of a stool, the plank being covered with a piece
t parchment stuffed with wool to form an elastic
on for the grinding operation. Only the outside
e has to be pumiced. The celebrated Strasbourg
n is prepared with remarkably fine pumice-stones.
small holes happen to be made in the parchment
nust be neatly patched by cutting their edges thin
asting on small pieces with gum-water.
skins for drum-heads, sieves and battledores are
red in the same manner. For drums the skins of
calves or wolves are employed, the last being pre-
. Asses' skins are used for battledores. For sieves
in of calves, she-goats and, best of all, he-goats are
yed. Church books are covered with the dressed
of pigs.
chment for printing purposes is imported from
e and is sold to the trade by the roll of sixty skins.
erage size is about four hundred square inches, at
eral value of about forty cents each. In ordinary
one out of four skins is spoiled upon the press, so
n additional quantity must always be allowed for.
loss should be taken off by slightly damping the
e, but not wetting it.

rdear (Sp.).—To be grayish (said of ink of poor
y).

rdoe Machine.—A rotary machine adapted for
aper work invented by J. Pardoe, in England.

rentesi (Ital.).—Parentheses.

rentesi Quadre (Ital.).—Brackets.

renthese (Ger.), **Parenthèse** (Fr.).—A paren-

renthesis.—A mark generally used in couples, as
icating the beginning and end of a sentence which
lanatory to the main sentence. In the plural the
s parentheses, but this is applied only to more than
arenthetical sentence with its marks. A paren-
mark may be either (or), the sentence inclosed be-
the two, or the two marks taken together. Very
use is now made of parenthesis marks compared
he custom of the last century. Then it was fre-
ly employed where we now have commas. For in-
, in Addison's time sentences were punctuated as
s: "I confess (said he) that there is no reason to
his statement." At the present day no one would
em thus. The present custom is to employ them
where the comma or the dash would be clearly
. The punctuation of the parenthesis differs in
nt offices. In some the parenthesis is treated as
of the sentence, and its punctuation is interwoven
t. Thus when it is said that "in Lincoln County,
aska,) this course is followed," the word Nebraska
ged to be necessarily connected with the remainder
sentence, just as it would be if the parenthesis
mitted, and the punctuation follows the ordinary
Sometimes the comma preceding the parenthesis
tted; but the prevailing and best usage is to treat
renthesis as foreign to the sentence, to punctuate
rding to its own matter. Thus, in a report in a
York newspaper of the appointments to office it
"The President remarked to Governor Flower
ad just arrived in Washington), but not in a seri-
ay, that," &c.

igini (Ital.).—An Italian type, next smaller than
reil.

Paring.—Reducing the edges of leather by forming a gradual slope.

Paring-Knife.—The knife used in shaving leather.

Paris.—The chief city of France; it has long been very active in printing and book publishing. Much copying was done there long before the invention of printing, and there were publishers and lenders of manuscript as early as the year 1400. When printing began, as it did in 1469, it was much employed, and Parisian printers soon attained a high rank. This beginning was through the agency of the College of the Sorbonne, l'Allemande de la Pierre being the prior, and Guillaume Fichet a doctor of laws. They succeeded in getting there three German printers, Ulrich Gering, Michael Friburger and Martin Crantz. Under the article FRANCE an account is given of those who have been most famous in Paris since then, and it is unnecessary to recapitulate them. The most famous in early days were the Stephenses, better known to English readers under the Anglicized form of their name than under the French form, Estienne. At the end of the seventeenth century appeared the Didots, who are still carrying on business and whose work casts a lustre on all other printers. Many famous masters of the craft have come up there within recent days.

The condition of the art in Paris is excellent under one point of view. The abundance of artists, the skill of hand which they have there attained, and the moderate expense which a publisher is obliged to incur in preparing a sumptuous book have caused a great number of fine works to be issued. These are indeed excellent both in their illustrations and their letter-press. There is a large number of rich persons who live in Paris the year round and to whom these books are addressed. Paris is much more the intellectual centre of France than London is of England, as in the latter country there are many persons who might dwell in the capital and do not, while in France it is an exception to find any person of means and ability who does not live in Paris if he can. This stimulates life in Paris at the expense of the provinces. Lithography is carried on to perfection. Newspaper printing is poor, and the ordinary job-work is also poor.

The French national printing-office is one of the largest in the world, and contains much which is not equaled elsewhere. The foundation is due to Francis I., who on January 17, 1538, nominated Conrad Néobar as his printer for Greek with a salary of one hundred golden crowns, and the next year appointed as successor Robert Estienne, who was already royal printer for Latin and Hebrew. In 1620 Louis XIII. established a workshop called the Imprimerie Royale, and intrusted its control to Neurel and Mettayer, who alone were authorized to print edicts, ordinances, rules, declarations and other royal documents. Among those who directed it after this date or were prominent in its affairs were Mabre-Cramoisy, Jean Anisson, Garamond and Grandjean. In 1694 Philippe Grandjean, the engraver of the king, was charged to prepare some new faces of type. His labors and those of his successors did not end until 1745, when they had cut in French nineteen Roman faces, ranging from the smallest to the largest. Each of these fonts contained by the express order of the king certain marks on a number of the characters which would serve to distinguish them from characters employed in other houses. A few of these distinctions are still used in the national printing-office, other establishments being expressly forbidden to imitate them. These signs consist in the doubling of the upper mark nearest to the stem of the letters b, d, h, i, j, k and l. The oval part of the letter b, for example, continues its stroke after the prolongation of the perpendicular line which forms an oval, and there is consequently a serif in the middle of the letter as well as at its top. These marks are not very large, but are easily distinguished. So jealously does the national printing-office guard its use of these letters that it refused to lend the editors of the admirable dictionary now appearing in the Typologie-Tucker the use of them in the article upon the government establishment. The Imprimerie Royale changed its name to the Imprimerie Nationale when the Revolution broke out, and was afterwards called the Imprimerie de la République. The director was beheaded. In 1811 Firmin Didot arranged the characters and enriched it with a beautiful collection of Oriental types. In 1813 Sylvestre de Sacy became the inspector of this portion of the establishment, which has increased in magnitude ever since the beginning of the century, and has now types which will enable it to compose works in two or three hundred different languages. The name of the establishment has often been changed within the hundred and forty years which have passed since the convocation of the States General. In front of the building is a beautiful statue of Gutenberg. Many complaints have lately been made by the printers of Paris and other cities of France that this office, the largest in the country and sustained by taxation upon the people, competes for work of a certain class with commercial printers, executing such orders for a less price than they can afford to charge.

There is more variety in customs in Paris than in the United States. Different offices have different regulations. As a rule, however, ten hours are worked, running from 7 to 6 or from 8 to 7 o'clock. An hour is allowed for déjeûner, or breakfast, in the middle of the day. This is a substantial meal. A quarter of an hour is allowed for refreshments in some places at 4 P. M. Wages are generally paid each week, in some places on Monday, and in others on Saturday; a number pay only every fortnight. Overtime is generally worth one-third more than day-work. The usual pay for compositors on ordinary work is fourteen cents a thousand ens, and weekly hands get about the same price per hour. Readers receive from $18 to $27 a fortnight. Copy-boys are little used, proofs being read by collating, or by the thumb, as it is called. Hand-pressmen get from $7.50 to $10.50 a week, and power-pressmen from $10 to $16 a week. The compositor wears when at work a black linen blouse which extends to his knees; pressmen wear a short blue jacket.

In 1888 Paris had 1,648 periodical publications, or just about double those of New York. Of these 94 were devoted to politics; 287 to trade, finance and commerce; 83 were literary and political reviews; 86 religious, and the remainder were divided among the various ideas and occupations of men. They are, however, smaller than those in New York, and it is probable more money is paid in the latter place on its journals for writing, composition and paper than is expended in Paris.

Parisiena (Sp.).—Pearl or five-point.

Párrafo (Sp.).—Paragraph; the sign §. Párrafo frances, paragraph set in triangular shape.

Pars.—A contraction in England for paragraph or short articles unrelated to others.

Parsons, John Davis, a printer and publisher of Albany, N. Y., was born in the village of New Baltimore, Greene County, N. Y., on April 27, 1815. He was the son of Stephen Parsons and Hannah Thorne Parsons. In 1823 the family removed to Albany. When a little over thirteen years old his school-days ended, and John D. Parsons entered the employment of Daniel McGlashan, who had a small book and job office and published a campaign sheet named the Signs of the Times in the interest of Andrew Jackson. In 1830 his employer died. Parsons then set up the type composing the plant in fonts, boxed it and sold it to other printers for the benefit of the heirs, and sought employment elsewhere. This was obtained at McKercher & McPherson's, and after their failure he worked for Stone & Munsell, E. & S. Skinner, Hoffman & White, and finally in 1835 for Packard & Van Benthuysen, who were sub-contractors for Edwin Croswell, the State printer. In 1840 the State printing went to Thurlow Weed, and Mr. Parsons went with it to Hoffman, White & Visscher, who were the sub-contractors. After Mr. Weed's contract had expired Carroll & Cook of Troy, who secured it for themselves, discharged Mr. Parsons, who was the rule and figure compositor, and placed in his stead Cornelius Wendell, afterwards Congressional printer. In 1843 a son of Thurlow Weed, James B. Weed, who also had been discharged by Carroll & Cook, formed a copartnership with Mr. Parsons under the firm title of Weed & Parsons, and four years after the proprietors of the Albany Evening Journal, Thurlow Weed, George Dawson and Visscher Ten Eyck, were admitted to the firm. Their place of business was on James street, Albany. A new building was erected on Columbia street in 1869. The business was singularly successful. In 1871, after about seventeen months' occupancy, the building was destroyed by fire, the loss being about $300,000. It was rebuilt, and in six months was again occupied. For many years this office has been one of the chief printing houses in the United States, executing printing, binding, electrotyping, stereotyping and publishing. At times it has employed two hundred compositors, all of its other work being on an extensive scale. It did the Legislative printing for ten years, and for thirty years it has executed the department printing for the State of New York. It also did the printing for the last Constitutional Convention. It was a union office years ago, but became non-union about 1874. Mr. Parsons has been a very skillful manager of a printing-office. In 1887 he was a delegate to the master printers' convention in Chicago which formed the United Typothetæ, and has since been frequent in his attendance upon meetings of the craft. He is now the only surviving partner of the firm, but is still strong and active, although seventy-eight years of age.

JOHN DAVIS PARSONS.

Particulars of Sale.—A class of work which comes under the head of legal or auctioneer's work.—*Jacobi.*

Partly Printed Newspapers.—Very nearly eight thousand newspapers in the United States and Canada are printed partly in one place and partly in another. This is done on the ground of economy. If two good journals are published fifty miles apart, both being carried on in the usual manner of country newspapers, it is probable that over one-half of the reading matter in one would be just as available for copy in the other, and consequently if there was any method by which they could exchange this matter a very decided economy would result from it. Such a saving, however, is better effected from some central office, where not only two newspapers can be served, but where several hundred can each retrench somewhat on their expenses. The story and miscellaneous matter on the first page, the agricultural matter on the last page, and the news on the second page are just as good for one as for another, and if, in deference to customers, political matter suited to the readers of each journal can be given, there are few country editors who will not feel that they have been relieved from much responsibility. They will have as good copy as they would themselves have selected, it will be better printed, and some money will also be saved.

To print a part of a newspaper in one office and to complete it in another is not new. It was occasionally

ced fifty years ago, and the Albany newspapers as
ck as 1845 used to issue supplements containing
ws or the Governor's message which they sold to
newspapers, with or without changing the head.
levelopment of this idea, as at present practiced,
to A. N. Kellogg and A. J. Aikins, two Western
paper editors, who during the Civil War were com-
l on account of the scarcity of hands to get a part
eir journals printed elsewhere. A dispute exists
en their friends as to priority. Both developed
lea. By 1868 it was well defined and well known.
blisher was charged a certain price per quire for a
lumn folio, and proportionate prices for larger or
er sheets, he agreeing to allow the central office to
thirty, forty or fifty inches of advertising in each
If more should be required an allowance in money
l be made to the publisher; if less, the central office
nothing about it, but filled up the space with read-
matter. Some publishers objected to giving this
amount of space to foreign advertisers, and others
ted to giving any at all. Part of the newspapers
d their miscellany upon the third and fourth pages,
g the first and second for news and other things.
there was a difference as to politics and as to relig-
d temperance. Many hard-headed editors thought
tter two classes of matter were of no value in ordi-
journals, while others insisted upon them. Some
ous errors have resulted from Republican matter
printed in Democratic newspapers, and from
s being inserted in temperance newspapers show-
ow sauces can be prepared with burnt brandy or
wine. One Jewish newspaper in New York pub-
in its household department a method of cooking
chops; but on the whole extraordinary vigilance is
ised, and it is pretty safe to rely upon what is re-
l. The subdivision is far greater than in former
, most newspapers now having some special direc-
which they wish to have followed. They are given
choice of matter, and can insert their own adver-
ents or have none on the part sent to them. The
s at their option, and also the day of publication.
printing must be executed early enough to make it
certain that it reaches the local office in time to
the second side printed. Most of these offices have
two hundred customers, and the proper handling
em requires great care. A memorandum of those
l might read Monday 38, Tuesday 32, Wednesday
hursday 55, Friday 27 and Saturday 12. There are
i-weeklies and semi-monthlies, as well as monthlies.
nalysis of any one of these days, even the largest,
l show that, with a dozen shapes, with four or five
ar kinds of matter, and with half instructed as to
l matter, it must be a surprise indeed when the
change required is that of the heading of the news-
, wherever found.

ese journals are popularly known as patent insides
tsides, according to whether the matter supplied is
e inside or outside of the sheet. Their offices are
itted up and have much type, and their presswork
rule is very creditable. They charge printers so
a quire for a certain size, either with or without a
price for the beginning quire. This is usually
uch beyond what the printer himself must give for
in small quantities bought on credit. The central
however, buys for cash and obtains a quantity.
then to make the necessary changes and to do the
work, which in nearly all cases causes a loss to be
n. For instance, if for two dollars ten quires are
ed, the paper costing one dollar and twenty-five
the change taking an hour's time of a man worth
cents an hour, and the presswork half an hour of
s worth ten dollars a day, two dollars and five cents
ready spent; but the employer ought to add in jus-
himself twenty or thirty cents to the compositor's
thus paying for the use of the building and the
llaneous expenses. The receipts of the office are largely from advertising, and if there shall be enough from this source to counterbalance the charges above mentioned and to pay for the share of composition and wear and tear of material the business is profitable. Apparently there should be four or five dollars' worth net of advertising in each number to secure this result. Nearly all of the business done in a co-operative printing-office is for spot cash. Customers are too weak to justify giving credit. The average circulation of such journals as are printed in country towns, it is stated, does not rise above two hundred copies in the West and four hundred in the East. Of the whole number of this kind of journals issued the proportion is far less in the East than in the West. Many journals thus printed also use plates or matter set up in some city, which is then stereotyped and sent out.

Much complaint has arisen from time to time among journeymen respecting the injury they claim to have received from patent outside offices and from offices where ready-set matter is furnished. It is plain that where two compositors are employed when the work is done at home, and afterwards by use of co-operative matter one is dispensed with, the latter receives an injury, unless he can immediately find another place. Many strikes have occurred on this account, and many cases have been carried on appeal to the International Union. The question is as yet by no means settled. Partly printed sheets are a great advantage to offices which desire to reduce expenses or which desire to continue publication, although a strike is in progress. It has therefore been proposed to boycott those who employ any other than union workmen or who sell sheets or plates to non-union offices. The opponents of this policy declare that these journals really increase the amount of labor which workmen receive. They render it possible for offices to be established everywhere. More newspapers are therefore sold and more job printing is collected. It is indisputable that the number of compositors in the United States increases very rapidly. They have doubled their numbers since the Revolutionary War every twelve years, while the population has only doubled in every twenty-six or twenty-seven. Part of the reason for this increase is the facility with which printing-offices can be established in small places.

Pasador (Sp.).—Key (piece of metal used for fastening rollers, &c., in their places).

Pasar el Ajuste (Sp.).—To pass the make-up; said in offices where each compositor makes up his own composition and passes the make-up to the next in turn.

Pasar las Postetas (Sp.).—To examine the sheets of a work to see that none are missing or duplicated.

Pasar las Pruebas (Sp.).—To revise or look over the proofs.

Pasigraphy.—A system of universal writing which may be understood and used by all nations.

Passer (Fr.).—To pass, to go beyond; passer les cassetins, to overflow the boxes.

Passing the Galley.—In slip-work, when a compositor has finished his copy he passes the galley, if not already filled, to the next in order.—*Jacobi.* In this country the custom of passing the galley in this way has gone into disuse. Formerly, when a compositor had set his matter, he began making it up. The take rarely ended with a page. He therefore, after putting the folio head and the blank-line upon it, followed them with as much matter as he had left over, and then took the galley with the incomplete page to the compositor whose take came next, who in turn made up. The page-gauge went with the galley. Now all matter is made up by the office, and this delivery of the galley from one workman to another is no longer required. Galleys are passed in American newspaper offices on account of correction. Usually four marks make a galley passable. The compositor who has the first error on the galley corrects down to the next take which has four errors. The first man takes out all of the slugs which precede his successor's take and closes up the matter.

Passing the Make-Up.—As each compositor finishes his copy he makes up his matter into pages, and then passes the make-up to the next in order.—*Jacobi.* This is the same operation described in the definition of PASSING THE GALLEY.

Pasta (Sp.).—Composition (for rollers). Speaking of paper it is said to be of buena or mala pasta, according to its quality.

Paste.—An adhesive which can be made from flour or from any starchy substance. That which is most generally used by bookbinders is derived from wheat flour. It is made into a thin cream with water and boiled. It is then tolerably stiff, and may be diluted with water so as to bring it into any required condition. It is sometimes of advantage to add a little common glue to the paste. When paste is kept for a long time it moulds, dries up and sours. A few cloves form perhaps the best preventive in small quantities; on a larger scale carbolic acid may be used; salicylic acid is a good preservative, a few grains added to the freshly prepared paste completely preventing souring and moulding. Rice makes a beautifully transparent paste.

Paste and Scissors.—Matter copied from journal to journal is sarcastically so termed.—*Jacobi.*

Paste-Downs.—The blank fly-leaves, sometimes colored, at either end of a book which are pasted down on the covers.

Paste Paper.—An end paper prepared by the binder from a compound of paste, coloring matter and a little soap. The mixture is made a little thicker than cream. It is spread upon two sheets of paper with a paste-brush. They must then be laid together with their colored surfaces facing each other, and when separated they will have a curious wavy pattern on them. The paper should be hung up to dry on a string stretched across the room, and when dry glazed with a hot iron. A great deal of this is used in Germany for covering books.

Paste-Points.—Very fine points used for very closely registered work on a hand-press.

Paste-Wash.—Paste diluted by water.

Pasteboard.—A thick and stiff paper product made by pasting sheets of paper together until the required thickness is reached. This can be done either by hand or by machinery.

Pastel (Sp.).—Pi; type over inked.

Patch Up.—To overlay or bring up an impression-sheet with pieces of thin paper.—*Jacobi.*

Pâté (Fr.).—Pi.

Pâté à Rouleaux (Fr.).—Roller composition.

Patent Rollers.—Rollers of a special composition protected by letters patent.—*Jacobi.*

Patent Space.—A space the thickness of two five-em spaces, used in a few places in New York in order to have more even spacing. It has been employed for about fifty years.

Patent Type.—The specially hard type made by the Patent Type-Founding Company, in London, England.

Patrices.—The punches used in making letters, so called in contrast with the matrices or matrixes.

Patrón (Sp.).—Tympan-sheet, or sheet on which a form is made ready.

Pattern-Board.—Pieces of pasteboard cut to the size of the leaf of any particular book by binders and used by them as gauges to determine the exact dimensions of that work. Such a device is also used by printers, two patterns being placed together over two pages of type, and sufficient furniture being placed between the metal so that the patterns shall touch, and only touch.

Payne, Roger, a celebrated bookbinder of the last century, was born in Windsor Forest in 1739, and began his art with Joseph Pote, bookseller to Eton College. He afterwards obtained employment from Thomas Payne, in London, who established him in business before 1770. They were not related, although of the same name. His taste was classical and his workmanship excellent, and had it not been for his dissolute habits he would have accumulated a fortune. He was fully employed by the book-lovers of that day, but his method of living entailed disease and poverty upon him. He died on November 20, 1797, and was buried at the expense of his friend Thomas Payne, who had allowed him a weekly sum for eight years before his death.

Pear-Wood.—The wood of the common pear-tree, used for engraving when boxwood cannot be obtained. It is, however, too soft for small work.

Pearl.—A very small size of type, and next to diamond the smallest regularly made by type-founders. It is between diamond and agate in size, and in body equals half of a long primer. About fifteen lines make an inch. By the point system it is five points. It is sometimes used for advertisements in well-printed weekly papers, as, for instance, in the Illustrated London News; Bibles and pocket dictionaries employ it; it is used for notes and references in standard works, and in job printing it is needed for orders of dancing. In French it has two names, Parisienne or Sédanoise, and it is Perl in German. The Dutch name is joly or peerl, and the Italian occhis di mosca.

This Line is in Pearl.

Pearl Diamond.—A size of type as made by the Patent Type-Founding Company, London. It is in size between pearl and diamond.

Pearl Ash.—Carbonate of potash. When this is diluted it is used as a wash for type.

Pedestal Ink-Table.—A small ink-table on a single leg or pedestal.

Peel.—A pole having at its end a transverse piece, used to hang up damp sheets for drying.

Peeling.—A process of preparing overlays by skivering or thinning down the hard edges of an illustration.—*Jacobi.*

Peine (Sp.).—Roller-rack in machine presses.

Pelts.—Untanned sheep-skins used for balls.

Pen.—An instrument used for writing. The ancients employed a reed, which was split and then brought to a point. Quills of birds were converted into pens, but when these first came into use is not known, although it is supposed in the fifth century. The oldest account is a passage of Isidore, who died in 636 A. D., and who, among the instruments employed for writing, mentions reeds and feathers. There exists, also, a poem on a pen, written in the same century, and to be found in the works of Aldhelm, the first Saxon who wrote in Latin. Alcuin, the friend and teacher of Charlemagne, mentions writing-pens in the eighth century. After that time proofs exist which put the question of their use beyond dispute. Mabillon saw a manuscript Gospel of the ninth century in which the Evangelists were represented with pens in their hands. The word calami properly signifies the reeds which the ancients used in writing. Modern authors often use the word as a Latin term for pens, and it is probable that the same was employed to signify quills before the time of Isidore. Reeds were used for a considerable time after the introduction of writing-pens. In convents they were retained for a long time for the initials only. By some letters of Erasmus to Reuchlin it appears that the former received three reeds from the latter and expressed a wish that Reuchlin, when he procured more, would send some of them to a certain learned man in England. Quills for some reason were about the year 1433 extremely rare in Venice. We learn from the familiar letters of learned men of that time that they were equally troubled by the rarity of quills and by the difficulty of making good ink. Steel pens have now been in use since about 1820, and since about 1845 they have superseded quills. There are still, however, a few people who use the latter, and all large stationers keep a stock on hand. Gold pens are much favored, and within the last dozen years fountain pens, with which from a hundred to a thousand words can be written without refilling, have been much in demand.

Pencil.—1. A small brush of camel's-hair, used by painters. 2. Something used to write with which does not require ink. Black pencils, which are most numerous, are made of graphite, which is first finely ground and then mixed with clay or some other substance to give it hardness. The whole is generally inclosed in a case of cedar or other wood which does not splinter easily; but sometimes the leads are used to charge a channel which holds them and gives them the necessary stiffness. Other substances are used to make colored pencils. Blue pencils are generally employed by editors on daily newspapers to mark out superfluous or objectionable matter, as its mark is very easily seen. A "blue-pencil fiend" is a term very often applied by reporters to those who thus revise copy.

Pennsylvania.—This State, one of the most important in the American Union, was the second in which the printing art was carried on. William Bradford began printing and publishing "near Philadelphia" in 1685, and continued in the exercise of this art until 1693, when, having been imprisoned for several months, he removed to New York, leaving the colony without a press for a number of years. See BRADFORD, WILLIAM, and PHILADELPHIA. The second printer was Reynier Jansen, who wrought from 1699 to 1705, and who was succeeded by his son, Tiberius Johnson. Andrew Bradford, who had learned his trade with his father in New York, began in partnership with him another house in Philadelphia, which continued for many years. The Sauers carried on the most extensive business in Philadelphia and Germantown before the separation from Great Britain; and Franklin was also a very productive printer. Philadelphia was a very important place in relation to the art in the second quarter of the eighteenth century, and has maintained its position ever since. The places in which the printing trade was exercised before the Revolution were Philadelphia, Germantown, Ephrata, Lancaster, Bethlehem and York. More than four thousand separate works are now known to have been issued before 1783. German printing began in 1728, and since that time has always been a very important branch of the business.

The printers mentioned by Thomas begin with Jacob Taylor as the successor of Reynier Jansen, but he did not consider Taylor as a real printer, but only as a contractor. Keimer was the one from whom Franklin obtained his first work. Hall, Franklin's partner, was a very valuable man to him. Printing began in Lancaster in 1751, and about 1746 Ephrata gained a press in order to explain the peculiar views of the Dunkards. This was a very important publishing house, issuing among other works the largest book brought out in America before the Revolution. After the Revolution printing-offices were established at Pittsburg in 1786, at Reading in 1789, Chambersburg in 1790, Harrisburg in 1791, Wilkesbarre in 1795, Huntingdon in 1797, Northumberland in 1798, Norristown in 1799, Doylestown in 1800, Williamsport in 1802, and Erie in 1808. After the war ended Philadelphia became the most important publishing centre in the United States, publishing and distributing more books than Boston, and retaining this position for many years. Pittsburg had an important newspaper press and published a few books. The other towns in the State were small, Lancaster being the largest, and it has not been until within a very short period that any of the cities have passed beyond thirty or forty thousand population, with the exception of the two already mentioned and Allegheny City.

At the time of the Revolution there were seven newspapers in Philadelphia, one in Germantown and one in Lancaster. The total number published in the State in 1810 was 71; in 1840, 187; in 1850, 310; in 1860, 367; in 1870, 540; and in 1880, 973. In the last year there were 98 daily, 678 weekly and 202 other periodicals. In 1892 there were 168 daily, 914 weekly and 321 other periodicals, or 1,403 in all. In this respect Pennsylvania ranks third among the States of the Union, New York publishing 1,971 and Illinois 1,438. In this State there are three type-foundries, several machine shops devoted principally to bookbinders' and printers' work, many paper-mills and places where paper is sold, and a very large bookselling and publishing trade. The newspaper towns rank in importance as follows: Philadelphia, Pittsburg, Scranton, Reading, Harrisburg and Erie.

Penny-a-Liner.—One who writes for newspapers by the line, applied in contempt occasionally in this country to reporters, but in England used to describe a class of writers who scarcely exist here, but who are numerous there. They are unattached reporters who sell news to any and all newspapers which will take it. There are unattached reporters here, but they rarely handle strict news, confining themselves generally to one specialty, and they send in their copy to only one or two newspapers. The penny a line was once the regular rate of payment in London, but it is now three halfpence, with a minimum of a shilling to a half crown, according to the newspaper, for each paragraph.

Per Mark.—A mark, ⅌, used in commercial matter to indicate that the word per is to be understood there, as 8 ⅌ cent., $150 ⅌ 100 bushels. It is a reproduction in type of a contraction existing long before the invention of printing.

Percer (Fr.).—To pierce, to point.

Perder or **Ganar** (Sp.).—To gain or make a line in making up pages. The true meaning of perder is to lose, and of ganar to gain. Thus, while these two words are usually opposite in definition, they are equally applicable typographically, as they express the idea of making one line less.

Perdido (Sp.).—Oversheets, to allow for spoilage and waste in working a form.

Perfect Paper.—Reams of paper made up to a printer's ream, that is 516 sheets, are said to be perfect. —*Jacobi*. In this country it simply means paper in which all of the sheets are equally good.

Perfect Up.—This is the printing of the second side of the paper in half-sheet or sheet work.—*Jacobi*.

Perfecting.—The act of printing the second side or reiteration of a sheet.

Perfecting-Machine.—A double cylindrical machine which prints both sides of the sheet at one operation. There are many varieties of this kind of press. In the Applegath & Cowper perfecting-machine, considerably used at present in England, the sheet is reversed between the two cylinders, its track resembling that of a horizontal ∽. At the first cylinder the sheet receives the impression from the first form, and at the second the impression from the second. This is the original perfecting-press as invented by König, afterwards improved by Applegath & Cowper. Part of each cylinder is cut away to facilitate the return of the carriage. Between the two cylinders, and in order to regulate the track of the sheet, there are two wooden drums, against which the tapes work, and these drums reverse the sheet, which is run out by tapes to a delivery-board between the two cylinders. The small cylinders are called register drums, because they regulate the time required for the transmission of the sheet from one cylinder to another. So far perfecting-presses have not been much used in this country, as the faint trace of ink left by one side upon the impression cylinder and by it passed on the other side destroys the beauty of the presswork. See PRESS.

Perfecting-Press.—A press in which both sides are printed before it is delivered.

Perfil (Sp.).—The hair-lines of ordinary type.

Perforating-Machine.—A mechanical contrivance for perforating purposes, by which little holes are made in a sheet of paper in order to facilitate tearing apart at some future time. They may be mere needle points, or else they may be a tenth or a twelfth of an inch in diameter.

Perforating-Rule.—A dotted rule standing high in a form of type which would partly cut the paper in printing. One disadvantage with such rules is that they also cut the rollers.

Pergament (Ger.).—Parchment.

Pergamentdeckel (Ger.).—The parchment spread over the tympan.

Period.—A mark of punctuation, indicating the completion of an ordinary sentence. It is a very thin letter, sometimes being no thicker than a five-em space. It is also a mark of abbreviation, as in Dr., Col., No., for doctor, colonel, number. In this case it does not exclude other marks of punctuation which follow it, but does not take another period after it when a sentence ends with an abbreviated word. In the punctuation followed by the best offices, however, it takes this mark as concluding after a parenthetical sentence, although there may have been an abbreviated word and a period before, as for example: "The gentleman will not deny that he has been influenced by the example of the eminent statesman who resides at Lexington, Ky. (Mr. Clay)." Periods are used by many printers to divide dollars from cents instead of a space or an en quadrat, as $8.50 instead of $8 50. This is in analogy with the practice with decimal fractions. Some newspapers and some books do not employ periods for certain well-known and very common abbreviations, as Mr Smith, Gen Grant, Dr Bibby. They are also frequently omitted in ship news and in lists of names in daily papers. The use of a colon for an abbreviation seems almost entirely to have ended, the period taking its place. In figure-work the period is often cast upon an en body to facilitate ease in justification. Sometimes periods separated an em or two are employed in the same way as leaders. From the ease with which they penetrate the paper, however, and from their tender face this is not to be recommended except upon fine books with small editions and excellent presswork. Sometimes periods are used to indicate a hiatus or an omission. They are then separated an em quadrat or more from each other. Periods are very often omitted, with other marks of punctuation, from title-pages, particularly where they occur at the end of lines, and are frequently dropped by job printers at the end of lines where much thin spacing must take place to get in the words. The same practice prevails with newspaper heads. Periods are frequently manufactured from colons by breaking off the top point, but this is by no means a good practice. This character is also known as a full stop or full point.

As a mark of punctuation it does not afford so much occasion for remark as most of the other points. It is the longest pause, and is commonly said to require four times as much time as the comma, or twice that of a semicolon. Some, however, give it six times the space of a comma. It ought not to be used until the completion of a sentence, and therefore the practice of ending one clause of a sentence with a period and following it by an em quadrat and then beginning the next sentence with a copulative conjunction, as "And," is to be severely reprehended.

Periodicals.—In the proper sense of the word all publications which appear at regular intervals are periodicals; but the term is generally restric
which are not devoted chiefly to news, an
issued in numbers more than a week apart.
prise reviews, magazines, annual registers
other varieties, covering almost the entire fie
knowledge. The first journal of the chara
view was the Journal des Savants, establis
Its success gave rise to Les Nouvelles de la
des Lettres, by Bayle; Le Mercure, by Visé
de Trévoux, by P. Catron, a Jesuit; in Ital
nale de' Literati, and in Germany to the A
rum. In England the first review of this
Monthly Review, begun in 1749. The Gentl
azine, founded at about that time, has end
day. In America the earliest periodical was
Magazine and Historical Chronicle, in 184
Portfolio, begun in 1801, had a wide popul
North American Review, founded in 1815, so
worthy representative of American literatu
Magazine, Graham's Magazine and the Kn
Magazine supplied our wants before 1850.
tablishment of Harper's Magazine, in 1850,
have been begun, and the field is now a div
American magazines are probably better p
trated and written than those of any oth
There were published in 1892 in Newfoundl
minion of Canada and the United States 1
periodicals, and of those published at less in
were 57 bi-monthlies and 2,886 monthlies, a t
issued at various intervals. Of these New
lished 626, Pennsylvania 260, Illinois 244
Massachusetts 199, Missouri 123, Iowa 187,
Indiana 89, California 79 and Ontario 79.

Periódico (Sp.).—Periodical; any publ
a regular time of issue.

Perla (Sp.).—Four-point body.

Perlee, Ralph N., an ink-manufactu
York, was born in 1822 in Somerset County
originally was in a mercantile occupation.
sons, however, rendered it desirable that he should relieve his father-in-law, George Mather, of some of the responsibilities which then rested upon him as a manufacturer of ink, and he entered the ink business in 1853. Mr. Mather, an able and kindly man, whose business began in 1816, died in 1861, and was succeeded by the firm of George Mather's Sons, of which Mr. Perlee was a member, the other partner being S. Talmage Mather, son of the founder. The latter died in 1887. Since that time the firm has reorganized as a joint-stock company, under
George Mather's Sons' Company, Mr. Perlee
ident. It has factories at Long Island City
City, with offices in New York.

RALPH N. P

Permanent Colors.—Inks which do
fade. Ordinary black inks are permanent
colored inks change after use. In particu
liant colors derived from aniline fade. It i
habit of many ink-makers to manufacture a
which of itself would be dull, and then mix
with a brighter hue of the same color ext
coal tar. Thus when the job is printed the
bright, and even after the lapse of years is
as the permanent pigment remains.

Persian Cases.—Cases of a special lay
the Persian language.

Persian Morocco.—An imitation morocco leather.

Persian Type.—The characters used in composing Persian are thirty-two in number. There are four forms. The Nishki was borrowed from the Arabians, who invented the characters; the Tâleek is the most beautiful handwriting used by the Persians; the Nustaleek is compounded of the Nishki and Tâleek, but is not as beautiful, and the Shekestah seems to be a character which has been much simplified for the sake of speed in writing. Characters to compose Persian must be obtained from English or German foundries.

Personal (Sp.).—The body of employees in a printing establishment.

Petit Tympan (Fr.).—The inner tympan.

Pettibone, Amos, a printer of Chicago, was born at Brasher Falls, St. Lawrence County, N. Y., on December 20, 1843, and with his parents removed to Illinois in 1850, where he lived upon a farm in the summer and attended school in the winter until the breaking out of the Civil War. He then enlisted in company D, Seventy-fourth Illinois Volunteer Infantry, serving with it until the close of the war. He settled in Chicago in 1865, and soon after became connected with the firm of Culver, Page, Hoyne & Co., who carried on business in stationery, printing and binding. He remained with them until their failure in 1883, and in 1885 established the firm of Pettibone, Wells & Co., of which he is now a member. He took an active part in the formation of the Chicago Typothetæ and of the United Typothetæ, and in 1890 succeeded Howard Lockwood as chairman of the executive committee of the latter body, being twice re-elected. In this position he has done much good work.

P. F. PETTIBONE.

Pettibone, Philo Foster, a printer and stationer of Chicago, eldest son of the Rev. Philo C. Pettibone, a minister of the Congregational Church, was born on April 28, 1841, at Mercer, Pa. Soon after his birth the family removed to Fitchburg, Mass., and a few years afterwards to Stockholm, N. Y. He was educated at the district school at Stockholm, St. Lawrence Academy, Potsdam, N. Y., and Beloit College, Beloit, Wis., graduating with honor from the last named institution in the class of 1862. Wishing some practical business training he at once accepted temporary employment as traveling agent for the old stationery and printing house of Culver, Page & Hoyne. This was his first business experience. In 1863 he was offered a permanent position with the house. In accepting this he abandoned designs of professional study and devoted himself with earnest purpose to the stationery and printing business. In 1868 he was admitted to a small participation in the profits, and in 1871, when the business was incorporated, he became a stockholder and director. In 1881 he severed his connection with Culver, Page, Hoyne & Co., and assisted in establishing the printing and stationery house of Brown, Pettibone & Kelly, now P. F. Pettibone & Co. While not a practical printer, his entire business life has been in connection with the printing business. Near the close of the Civil War he served for a few months as a private in Company A, One Hundred and Thirty-fourth Illinois Volunteers. He has been actively identified from their organization with the Chicago Typothetæ and the United Typothetæ of America. He is an able and skillful writer and a most eloquent speaker.

Pfister, Albert, an early printer of Bamberg, and one of those who are said to have discovered the art of printing. He printed in the year 1462 the Book of Four Stories, and an examination of its types showed their identity with those employed on the Bible of thirty-six lines. The characters are much worn and are by no means as good as those employed on the earlier book. Later researches have shown that he printed at least one work, the Book of Fables, in 1461. Sixteen books and pamphlets in all have been attributed to him, but his claims to eight of them have been disproved. He had only one size and face of type, and it had evidently been used on Latin only until a late period; for while the characters employed in that language were worn the w, k and s, used in German, were sharp and well defined. Nothing is known as to Pfister's birth or death.

Phalanx.—A subdivision of the force of a composing-room, first devised by Horace Greeley. In his day the hours on morning papers were far longer than they are now, and in order to relieve the men as much as possible they were divided into sections or phalanxes. One phalanx was let off when the copy began to slack up, say at about 1 o'clock. The second phalanx went an hour later, the third perhaps at about 2:30 o'clock, and the last phalanx when the paper was entirely finished. The first men off were expected to be also the first in the morning.

Philadelphia.—The principal city in Pennsylvania and now numbering over a million of souls. It was the first place in the United States south of Boston and Cambridge in which printing was done. WILLIAM BRADFORD, of whom a full account appears elsewhere, was the first printer, and the first work was an almanac. He left Philadelphia for New York in 1693, and for several years no press was in operation. In 1699 Reynier Jansen began to print and continued until 1705. Jacob Taylor consulted with the Assembly in 1712 concerning the printing for that body, and it has been supposed from this that he was a printer. No proof of this appears, however, and it is now inferred that he was simply a contractor or person delegated to make a bargain. Andrew Bradford, the son of the original printer, who had learned his trade in New York, went to Philadelphia in 1712 and remained there to the time of his death, in 1742. Until 1723 he was the only printer in the colony. He carried on many occupations besides printing, as his office was a place where a multitude of commissions were left to be executed. In the year mentioned a second printing house was opened by Samuel Keimer. The latter was ignorant of presswork and was a religious visionary. He was also immethodical in his business ways, and did not attain success. In 1723 Benjamin Franklin arrived in the city which he was to make his future home, and was employed at intervals by both Keimer and Bradford. The latter was a successful man, and on December 22, 1719, published the American Mercury, the first newspaper printed in Pennsylvania. Franklin proved to be a successful and ingenious journeyman, and the father of one of the apprentices employed in Keimer's office, Hugh Meredith, furnished the money necessary to establish the young man and Franklin in business. This was before 1730. Meredith withdrew after a time and Franklin continued alone. In 1748 Franklin formed a copartnership with David Hall, which lasted for eighteen years. The latter was an excellent Scotch workman, and managed the affairs of the printing house while Franklin was absent from the country or engaged in public business at home. Andrew Bradford was succeeded in business by William Bradford, son of the William Bradford of New York who was a plumber. He continued till 1766 alone, when he received his son Thomas as a partner. When the Revolution broke out he took an active part in the contest, as did his son. William Bradford was a colonel. Thomas Bradford continued the business up to 1814. Other early printers, who confined themselves largely to German, were Joseph Crellius, Godhart Armbrüster and Anthony Armbrüster. Henry Miller, William Dunlap, Andrew Steuart, William Sellers, William Goddard, John Dunlap, Robert Aitken and others were printers of the middle of the last century. In Germantown Christopher Sauer and his sons carried on business after 1738. Sauer was also a paper manufacturer and a binder, and when new types were necessary he was able to cast them. In 1743 he issued from his press, on a German long primer type and in that language, an edition of the Bible in quarto. It was nearly three years in the press. His son, of the same name, was also a skillful workman and carried on business on an enlarged scale. He published a weekly newspaper. In 1772 he set up a type-foundry, the first in British America. Printing-ink of the best quality was made by him, and he manufactured his own presses. His reputation was very high and his profits were large; but when the Revolution broke out his estate was confiscated, as he did not take sides with the colonists, remaining neutral. Christopher Sower the third, Daniel Sower, David Sower and Samuel Sower followed them, the spelling of the name having been changed. They seem all to have been good workmen and good men. During the Revolution the city was held alternately by the English and Americans, the latter retreating to safe places in the country when there was danger. Aitken printed the Bible there towards the close of the war, finding that there was a scarcity of this book; but it was completed so short a time before peace, which was followed by a fresh importation, that there was very little made by him in this venture. After the close of the war, from the fact that Congress sat there and the Constitutional Convention also held its sessions in the city, Philadelphia became even more important than it had been as a publishing centre. The first daily paper was established there in 1784, and there also was the seat of one of the two chief booksellers in the United States, Mathew Carey. Unlike Thomas, his principal rival to the north, Carey issued many original works of high value, Thomas confining himself chiefly to works whose worth had been ascertained by prior publication. For forty years Philadelphia was the centre of the book trade, and in losing its primacy still made a very excellent second. Thomas Dobson was an early printer and bookseller of learning who reprinted Rees's Cyclopædia with many additions. William Young and William Fry were of the generation which sprang up at the close of the Revolution, the latter for many years bearing the reputation of being the best printer in the country. Barlow's Columbiad was from his press. Bradford & Inskeep, the former from the family which gave the first printer to Philadelphia and New York, published the first edition of Irving's Knickerbocker. Abraham Small's imprint is well remembered, as is that of William Brown. In the latter office glue rollers were first tried, buckskin rollers having been experimented with by Hugh Maxwell about 1815. Among other of the early Philadelphians were John C. Clark and Matthias Raser, who founded a firm which is still in business. Lydia Bailey and Jane Aitken carried on printing-offices with success, each having a good line of trade. In Isaac Ashmead's office it is said that machine-presses were first employed in Philadelphia, the pattern being that of Treadwell. The sheets were 23 by 18 inches, and horse-power was first used, being succeeded by steam after a couple of years.

In 1810, according to the United States census, there were 51 printing-offices in Philadelphia, and 153 printing-presses. The number of volumes annually printed in the city was estimated at half a million. In 1824 there were 55 printing-offices, with 112 presses, supporting about 150 workmen.

Stereotyping was begun about 1817 by Jedediah Howe, who was a man of enterprise and skill, but who did not live long. His establishment was taken by John Fagan, who did excellent work. Lawrence Johnson reached Philadelphia a short time before Mr. Howe's death, and also began stereotyping. There was no bitter rivalry between the two, and the business of each rapidly increased. Johnson finally consolidated his stereotype establishment with the type-foundry formerly belonging to Binny & Ronaldson, and in time became eminent as a type-founder. Since that time Philadelphia has had many excellent stereotypers, as it now has many excellent electrotypers.

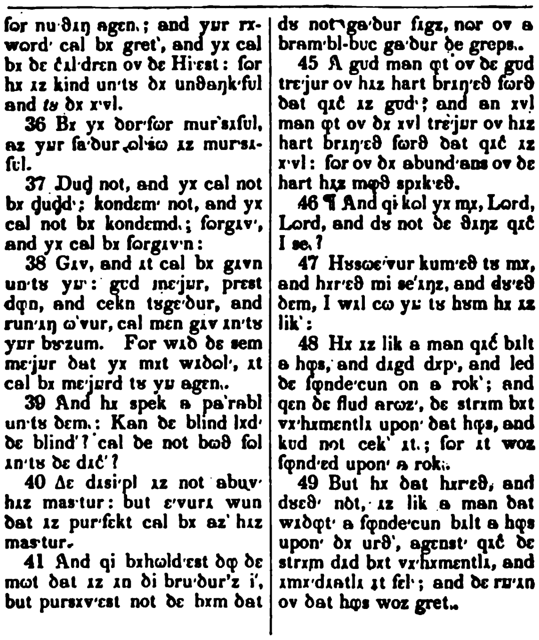
In 1811 Conger Sherman, who founded what has for many years been the principal commercial printing house in Philadelphia, reached that city. He entered Fry's office and distinguished himself by his assiduity, and about 1830 began business for himself. His trade grew rapidly. Tillinghast K. Collins and Philip G. Collins, King & Baird and a multitude of others succeeding them and their contemporaries have for fifty years kept up the reputation of that city for good work.

Type-founding began in 1795 as a permanent business by Binny & Ronaldson, but there had been prior founders there. Christopher Sauer or Sower began a foundry in Germantown in 1772. His principal workman was Justus Fox, who afterwards carried on the business until he died, in 1805. All of the early castings were for German, but after the Revolution some Roman punches were cut. Jacob Bay began a second foundry in Germantown two or three years later than Sower. Another foundry outfit was bought in Paris by Dr. Franklin for his grandson, Benjamin F. Bache, but was little used. John Baine, a Scotch type-founder, came to America and settled in Philadelphia about 1785. His grandson accompanied him. They were good workmen and had full employment. Baine died in 1790, and his grandson soon after relinquished business. Among those who joined Binny & Ronaldson when they began was Adam G. Mappa, who had been a type-founder in Holland and afterwards in New York. The Binny & Ronaldson foundry was very successful, and for a number of years was the only one in America. It passed into the possession of Lawrence Johnson and associates, and later has been known as the MacKellar, Smiths & Jordan Company. Collins & McLeester have carried on business in that city for many years, and there have been a number of other establishments there since the year 1800, many of them, however, having been short-lived. The manufacture of printing-presses in America was practically begun as a business in Philadelphia with Adam Ramage, a Scotchman, who immigrated there soon after the Revolution. His only predecessor died just before the second war with Great Britain. The presses manufactured by Ramage were made of wood, but after the introduction of the iron press were remodeled and made in some considerable portion of iron. Printing-ink was manufactured in Philadelphia for the trade about the year 1805, although it had been made for more than a century by private individuals for their own use. One of the earliest houses still exists, and there are several other ink-makers. There are two or three press-builders. Stereotyping, as has been stated, was introduced about 1817, and electrotyping began about 1850. In book publishing the trade of Philadelphia has always been very important. The J. B. Lippincott Company is the largest distributing house in the Union. Much religious printing is done in Philadelphia, and it has a fine business in the subscription-book line. Newspapers have been published continuously in Philadelphia since the date of the venture of Andrew Bradford, and daily newspapers for over a century. These journals have always been respectable, but were not distinguished for enterprise until within the last two decades, when the daily papers began to move forward with great activity. They are now characterized by ability as well as fairness. In 1892 there were 18 daily and 276 other periodicals. Many of these are housed in magnificent edifices.

Lithography, steel engraving and process engraving are very largely carried on in the city. In bookbinding Philadelphia makes a very favorable comparison. Every requisite for this or any of the other trades connected with publishing can be obtained there.

Phonography.—See SHORTHAND.

Phonotypy.—The art of printing with types representing the sounds of the human voice. This has been attempted many times, but more seriously and on a larger scale in English about 1848, when punches were made for the additional characters required, and newspapers were printed in the new types. The changes consisted primarily in dropping the redundant characters and devising new letters to express the sounds which are now imperfectly indicated or are grouped together under a single letter. Thus there is one ordinary sound to the letter t, that found in the word ten; but in the word this the t is not sounded at all, nor is the h. Th forms an arbitrary mark for a new sound which bears no resemblance either to t or h, but has more analogy to f or z. This combination, again, is not alone used for th as in this, but for another which is analogous, that of th in thin. There is no method of telling which sound shall be heard. In some of the dictionaries the th in though is pronounced in analogy to thin, while others give it a resemblance to this. In phthisic the t sound alone is heard. Thus there are four ordinary methods of interpreting the letter t. Some other letters have a far greater variety. There can be no question that the present system is very chaotic and unworthy of a language so great as English, and the reformers have therefore determined to add extra letters for th, TH, ng and other sounds now unrepresented; to differentiate the vowels now indicating different vocal movements, as in make, mAt, mar, father; to devise new forms for the diphthongs, to discard unnecessary characters, and to show the accent. Many of these changes have been noted by the use of accents, others by small capitals in the centre of words, but a few by new marks bearing a resemblance either to some character in Greek or in English. The whole number required in English, according to some authorities, would be thirty-six, but according to others forty-four characters will be requisite. These again must be in Italic, small capitals and capitals.



CAP. VII. ST. LUK. 105

for nu·ϑɪŋ agɛn.; and yur rɪword· cal bɪ gret', and yɪ cal bɪ ðɛ ćɪl·drɛn ov ðɛ Hi·ɛst: for hɪ ɪz kind un·tʊ ðɪ unϑaŋk·ful and tʊ ðɪ ɪ·vl.

36 Bɪ yɪ ðor·fɷr mur'sɪful, az yur fa·ður ɷl·sɷ ɪz mursɪful.

37 Duʤ not, and yɪ cal not bɪ ʤuʤd·; kondɛm· not, and yɪ cal not bɪ kondɛmd.; forgɪv·, and yɪ cal bɪ forgɪv·n:

38 Gɪv, and ɪt cal bɪ gɪvn un·tʊ yu·: gʊd mɛ·jur, prɛst dɷn, and cekn tʊgɛ·ður, and run·ɪŋ ɷ·vur, cal mɛn gɪv ɪn·tʊ yur bʊzum. For wɪð ðɛ sem mɛ·jur ðat yɪ mɪt wɪðol·, ɪt cal bɪ mɛ·jurd tʊ yu agɛn..

39 And hɪ spek a pa'rabl un·tʊ ðɛm.: Kan ðɛ blind lɪd· ðɛ blind'? cal ðe not bɷϑ fol ɪn·tʊ ðɛ dɪć'?

40 Δɛ dɪsi·pl ɪz not abuv· hɪz mas·tur: but ɛ·vurɪ wun ðat ɪz pur·fɛkt cal bɪ az' hɪz mas·tur.

41 And qi bɪhɷld·ɛst ðɷ ðɛ mɷt ðat ɪz ɪn ði bru·ður'z i', but pursɪv·ɛst not ðɛ bɪm ðat dʊ not ga·ður fɪgz, nor ov a bram·bl-buc ga·ður ðe greps..

45 A gud man ɷt ov ðɛ gud trɛ·jur ov hɪz hart brɪŋ·ɛϑ fɷrϑ ðat qɪć ɪz gud·; and an ɪvl man ɷt ov ðɪ ɪvl trɛ·jur ov hɪz hart brɪŋ·ɛϑ fɷrϑ ðat qɪć ɪz ɪ·vl: for ov ðɪ abund·ans ov ðɛ hart hɪz mɷϑ spɪk·ɛϑ.

46 ¶ And qi kol yɪ mɪ, Lord, Lord, and dʊ not ðɛ ϑɪŋz qɪć I se.?

47 Hʊsɷɛ·vur kum·ɛϑ tʊ mɪ, and hɪr·ɛϑ mi se·ɪŋz, and dʊ·ɛϑ ðɛm, I wɪl cɷ yu tʊ hʊm hɪ ɪz lik':

48 Hɪ ɪz lik a man qɪć bɪlt a hɷs, and dɪgd dɪp·, and led ðɛ fɷnde·cun on a rok'; and qɛn ðɛ flud arɷz', ðɛ strɪm bɪt vɪ·hɪmɛntlɪ upon· ðat hɷs, and kud not cek' ɪt.; for ɪt woz fɷnd·ed upon· a rok..

49 But hɪ ðat hɪr·ɛϑ, and dʊɛϑ· nɷt, ɪz lik a man ðat wɪðɷt· a fɷnde·cun bɪlt a hɷs upon· ðɪ urϑ', agɛnst· qɪć ðɛ strɪm dɪd bɪt vɪ·hɪmɛntlɪ, and ɪmɪ·dɪatlɪ ɪt fɛl·; and ðɛ ru·ɪn ov ðat hɷs woz gret..

EXTRACT FROM COMSTOCK'S PHONETIC NEW TESTAMENT.

Photo-Aquatints.—These are pictures which are printed from intaglio copperplates. The process is said to be simpler than the photo-gravure. It is adapted for reproducing portraits direct from life.

Photo-Caustics.—This name is given to photolithographs produced in half-tone by means of a Meisenbach ruled negative.

Photo-Electrotypes.—Many processes have been proposed for producing electrotypes from gelatine relief surfaces. Among the most successful are those of Paul Pritsch of Vienna, 1857; Alphonse Q. Poitevin of Paris, 1862; Paul Emile Placet of Paris, 1864; W. A. Leggo and G. E. Desbarats of Quebec, 1865; W. H. Mumler of Boston, 1875. All of these consist substantially in exposing a sheet of chromatized gelatine under a negative to the action of light. The effect is to render the parts reached by the light insoluble and non-absorbent for water, while the parts protected by the negative remain soluble in warm water and other solvents and retain the property of absorbing cold water and swelling. After the exposure under the negative the gelatine is either simply soaked in water to swell the whites, or it is treated with warm water, acetic acid or some other solvent to wash them away. In either case, by making molds of wax or plaster it is easy to electrotype a copper relief block for typographic printing. By the use of Meisenbach or other grained negatives half-tone effects are obtained.

Photo-Engraving.—See PROCESS PRINTING.

Photo-Engravings.—In America this term is applied to type-metal relief blocks for typographic printing. These blocks have been made from gelatine reliefs, plaster molds being used for casting the type metal. The Moss process belongs to this class. It is said that the peculiarity consists in first taking a mold from the gelatine relief with a mixture of asphaltum, rosin, sulphur and india-rubber, and with this mold making a second mold in plaster-of-paris for the casting of the type metal.

Photo-Gravures.—Numerous processes have been invented for producing copper intaglio plates by the aid of photography, beginning with the process of Niepce, 1827. In some of these processes the picture was etched into the copper; in others a mold was prepared and the plate was electrotyped into existence. Many firms in Europe and this country now prepare these plates, and the results are very fine. The processes, however, are rarely given to the public.

The process of Woodbury, 1870–2, which was worked with the best results by Goupil & Co., of Paris, consisted in preparing just such a gelatine relief film as was made in the Woodbury type process. There was one modification, which consisted in adding a gritty powder like pulverized glass to the gelatine to produce a grain in the relief film. This relief is used to make a mold which is needed for electrotyping the final copperplate. Another process consists in coating the metal with chromatized gelatine, exposing under a transparent positive and etching through the gelatine with perchloride of iron.

Photo-Lithography.—In this process the work is placed on the stone by means of photography instead of being drawn by hand.

Photo-Zincographs.—This name is sometimes given to pictures printed from zinc plates to which the design has been transferred in adhesive transfer-ink from paper. The plate is then treated with acid to sink the whites, thus producing a low relief.

Photographic Cards.—Cards used for mounting photographic prints.

Pi.—Type broken down and in complete confusion. If simply turned around it is squabbled. Pi must be distributed immediately. If in small quantity, not more than a handful and without admixture of other letter, it can be distributed just as it is found; but where there is much of it, and particularly when fonts are mixed, it should be set up and looked over carefully for wrong fonts. It is a bad plan to give apprentices pi to set during their first few days at work, for they should start out with type arranged as it should be in the case, and they can very easily learn bad habits while handling the pi. In large quantities, as when a form is pied, men should be put on by the hour, composing it first and then distributing it. Compositors who are in the habit of filling quadrat boxes or other boxes with pi should be discharged. It is an old custom to pick up the types under the cases and put them into each man's stick or a piece of paper lying in his case; but it is often doubtful whether this type is worth distributing after falling such a distance and then being stepped on as well as covered with grit and dirt. A fertile source of pi comes from leaving pages and jobs unsupported on the stone. A slug at the foot with an old stereotype plate against it and a quoin loosely wedged against a stick at the side would prevent this. Much pi comes from letting forms stand on letter-boards and then picking them. The last is something which should be resorted to only in the most extreme cases. There is a great loss of money in picking, even if the lines do not afterwards fall down. Forms kept standing with wooden furniture or wooden quoins should be tested every day or two, but with metal furniture and quoins once a week is enough.

Pi Ching, an ingenious Chinaman who about the year 1041 invented the process of printing as carried on by the Chinese.

Pica.—The largest ordinary size of book type, one size larger than small pica and one smaller than English. Six lines make an inch. It is the standard of measurements for leads, furniture, rules and width and length of pages, which are computed by picas and not by inches and fractions of an inch. It is also the standard of the point system, being divided by it into twelve equal parts called points. The common leads in a printing-office, known as six-to-pica, are two points in thickness; nonpareil, which is half as large as pica, is six points. Pica is much used for sermons and works in which space is not much regarded; auctioneers' catalogues have nearly always been set in this type, and it is frequently used for the body of jobs in job offices. There are many display faces of the pica size. In French this is called Cicéro, being the same in German, mediaan in Dutch, lettura in Italian and lectura in Spanish and Portuguese.

This is Pica Roman.

Pica Clumps.—Pieces of metal of pica depth in body are thus known in England.

Pica Reglet.—Wooden furniture of the thickness of pica.

Pick Brush.—A brush which is used to remove picks.—*Southward.*

Pick Sorts.—To take a letter or letters from matter not yet distributed, live or otherwise, for use elsewhere. This is sometimes necessary, except in offices with very great quantities of material. For instance, in a directory under the letter A, all of the capitals of that kind may be used in the first two forms, and the total quantity of letter may not be more than enough to set up four forms, although the letter A extends to the third signature. Composition goes on, the men turning for A in the last two forms, which contain the end of A and the beginning of B. When the first two signatures are printed and the type is laid up the form is picked for A, which is inserted where it is needed. The work could not wait for all of the matter to be distributed. A similar thing would happen with each of the other letters. Generally speaking, however, picking is not required. Matter is kept standing too long. It is better to distribute jobs as soon as they are worked off than to permit the matter to stand on stones, standing-galleys and letter-boards on the presumption that the order may some day be repeated. The compositor spends too much time in looking for sorts in forms, while he ought to be able to find them instantly in cases.

Pick-Up.—A line or lines which a compositor can take from a dead form or from a standing-galley and use in one of his takes without freshly composing the matter. Pick-ups are very frequent on some of the daily newspapers. Some forbid their use.

Picker.—A corrector or finisher of stereotype plates. In olden times a fine bodkin was thus termed.

Picking.—Touching up or repairing stereotype or electrotype plates.

Picking Up Stamps.—An English slang expression for picking up type.

Picks.—Spots occasioned by dirt which gets into the hollows of the letter and chokes up the face.

Pictures. — Graphic representations. Illustrations were printed before books, and formed one of their principal attractions after the art of printing was invented. They appealed to every eye. The first form was painting in water color, the second in oil colors, and the third stenciling. Wood-engraving preceded printing by letters half or three-quarters of a century. Copperplate engraving came last of all the earlier arts. Pictures are still a great attraction in books, but are now produced chiefly by process plates.

Pie.—Type broken or indiscriminately mixed.—*Jacobi.* This spelling is used to some extent, but American authority is clear that pi is preferable.

Pié (Sp.).—Foot-line or slug. Pié de imprenta, imprint of an office.

Piè di Mosca (Ital., literally fly's foot).—A paragraph mark, or ¶.

Piece-Work.—Work paid for by result, in accordance with a fixed scale of charges; distinct from time-work. Work is usually most valuable to the employer when he can thus regulate it. Presswork was once done by the piece, the price being so much a token. The compositor in the United States takes for his standard a thousand ems, but in England a thousand ens.

Pieced.—Any space of a book-cover which has another leather upon it, as a lettering piece.

Piecing Leads.—In wide measures of type the leads required are usually pieced, because long leads are apt to get bent or broken, and because as the demand for them is small it is hardly worth while to keep a stock on hand. When pieced the joint should not follow for a number of lines, but the long and short pieces should alternate on either side. If eighteen and twenty-four ems are used together they should be thus placed after the first line and after the next as twenty-four and eighteen.

Pierce, Richard, an early Boston printer. His books bear date from 1684 to 1690.

Pierre (Fr.).—Stone.

Pigeon-Holes.—Unusually wide spaces found between words in any printed matter, caused by carelessness or want of good taste by the compositor; also shelves in an office, divided into square sections to hold a number of papers, &c.

Pigs.—A term of derision once applied to pressmen by compositors. The pressroom was called a pigsty.

Pigskin.—The skin of the pig, used as a material for binding; common in the fifteenth and sixteenth centuries, but now almost in disuse. It is very durable.

Pigsty.—A pressroom was formerly sometimes thus designated by compositors.

Pile of Books.—A stack of books bound, or in sheets, if gathered.

Pile of Paper (or work).—A stack of printed or unprinted paper.

Pin-Mark.—A little mark at the side of each letter made by the type-founder. It is occasioned by a projection in the mold.

Pin-Tickets.—Tickets of small size to be affixed to packages and rolls of dry goods.

Pincettes (Fr.).—Pincers, tweezers.

Pinched Post.—A size of writing-paper in England. It is a small post size, 14½ by 19 inches.

Pinned Cases.—Those cases which have each box pinned down at the corners by a pin which passes from the top to the bottom; this makes the joining far more secure.

Piñon (Sp.).—Pinion; a quoin made on the principle of a pinion.

Pins.—French brads or nails used for mounting plates on wood.

Pinzas (Sp.).—Tweezers; grippers.

Pinzetta (Ital.).—Pincers. "Without this instrument," gravely remarks the author of an Italian book on typography, "the compositor could not work."

Piquer (Fr.).—To point, to prick.

Piquer des Lettres (Fr.).—To pull out letters with a bodkin.

Pisar (Sp.).—To take an impression; to run waste sheets in order to dry the form, &c.

Piso (Sp.).—The block or mounting for stereotype or electrotype plates.

Pistero (Sp.).—Small oiler.

Pittsburg.—The first city west of the Alleghany Mountains in which a printing-press was established. On July 29, 1786, the Pittsburg Gazette was established there by J. Scull & Hall. Business has grown steadily since then, as Pittsburg is a great manufacturing centre. It now publishes eighty newspapers, twelve of them being daily. Several of these have very fine buildings and are excellent property. Job printing is carried on here by sixty or seventy establishments, some of them being large and doing excellent work.

Placard.—In America this word has only a literary use. Printers do not employ it. As defined by Southward, placards are in England large printed sheets, intended to be posted on walls and to be read by passers-by, sometimes at a considerable distance. They are also called broadsides, posting-bills and bills. The chief descriptions are proclamations, official regulations, auction bills; sermon, bazaar, lecture, theatre and meeting notices; tradesmen's bills, contents' bills and lost and found bills.

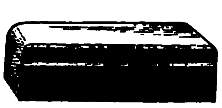
Plain Finish.—In bookbinding a simple creasing in blank on each side of the bands on the back of the book, with no gilding except the title.

Plain Rule.—Brass rule containing only a single straight line upon its surface.

Plana (Sp.).—Page of matter; plana corta, short page; plana larga, long page; plana en blanco, blank page.

Plancha (Sp.).—Plate.

Planer. — A flat, smooth piece of wood used for leveling the type before locking up. There are also proof-planers, used for taking proofs; these are of wood, covered with cloth or india-rubber.



PLANER.

Planing Down.—The act of leveling the type by means of a wooden planer. This should not be done with great force, for if the form is properly locked up little is required to give an even surface. Should anything rise above the level in such a form it is a proof that there is something beneath the type. The form should be unlocked, the handful lifted, and the stone and bottom of the handful each examined. It is usual to plane down a form twice, the first time being when the furniture is all properly arranged and the quoins are somewhat tightened. The second is when the whole is ready and nothing more is to be done except to take the form off the stone. The theory of this second planing is that the type is liable to spring somewhat, occasioned by the locking up, and it should be forced down again to a level. Many good workmen, however, plane down only once. Care should be exercised in moving the planer about that it shall not fall with force upon the type; neither must the planer be held a quarter of an inch or so above the surface of the form and then allowed to strike the face with each blow of the mallet. The planer should be immovable while receiving the impact. Noisy and long-continued planing down is very injurious to the type. While planing down it is usual to see that the furniture also touches the bottom everywhere. A quoin placed against a wooden piece and lightly tapped will accomplish this.

Planing-Machine.—A machine used for planing the backs of stereotype or electrotype plates or squaring up plates and blocks. See ELECTROTYPING.

Planiren (Ger.).—The process of sizing boards in a bookbindery, making them more lasting and suitable for writing on with ink.

Plank.—The mahogany or other wood out of which the coffin of a wooden hand-press was made. When completed this word rather expressed the article made than the material used.

Plant.—This term, as used in England, covers the whole of the working material of a printer—machines, type, &c. Within a few years it has also been introduced in the same sense into America.

Plantin, Christopher, an eminent printer of Antwerp who flourished there two hundred years ago. He was born near Tours, in France, in 1514, and studied his art under the king's printer at Caen. He established himself at Antwerp, where he published in 1555 a duodecimo volume, which in the dedication he describes as the first blossom from the garden of his printing-press. Plantin gradually extended his business until in 1576, when he was visited by De Thou, celebrated as the patron of fine printing, he had seventeen presses in constant employment and was spending over two hundred florins per day in wages to his workmen. His office was one of the ornaments of the city of Antwerp, and he became so celebrated for the beauty of his typography that the King of Spain conferred upon him the title of architypographus, with a very handsome salary and a species of patent for printing certain religious works, with which he almost exclusively supplied both Europe and the Indies. The King of France endeavored to prevail upon Plantin to return to France, but he preferred to remain in Antwerp, and finally established branch printing houses at Leyden and Paris. Plantin was exceedingly liberal in his expenditures, retaining the services of a number of men of great learning as the correctors of his press, and lavishing large sums upon all of the details of his business in order to insure accuracy and beauty. He died in 1589 and left a large property to be divided among his children. He had no son, and his three daughters having married men connected with typography, either as practical printers or correctors of the press, Plantin left his establishment to them as their dower. John Moret or Moretus, the husband of the second daughter, succeeded Plantin in the principal establishment at Antwerp, and the office was in the possession of the descendants until a very late date. One of the most remarkable productions of Plantin's press was the celebrated Polyglot Bible, issued in 1573 by authority of Philip II. of Spain. It was in Hebrew, Greek, Latin, Chaldaic and Syriac, and formed eight folio volumes. Forty workmen were employed continuously on this Bible for four years, and the labor alone cost 40,000 crowns. There were only five hundred copies printed, and a large portion of the edition was lost in a wreck at sea on the passage to Spain. The office itself continued in the possession of successive members of the family down to 1875, when Edouard Joseph Moretus ceded it to the city of Antwerp for 1,200,000 francs, to be forever maintained as a public institution under the name of the Musée Plantin. The last proprietor of the famous Officina died at Antwerp on June 28, 1880, but there still remain descendants of his brother.

The museum consists of a number of buildings inclosing a square. These are known as the printers' workshops and the corrector's rooms. There are several stories, some of the rooms in them having been the counting-rooms and offices of the establishment, while others were the domestic apartments of the members of the family. The old presses, type, foundry and materials of Plantin and his successors have all been carefully preserved, as well as the account-books and correspondence. It is regarded by all printers who have visited it as a museum of great value and beauty.

Plaster Stereotype.—Stereotype plates cast from plaster molds.

Plate.—1. The bottom or wide, flat part of a stick. 2. The engraved copper or steel sheet of metal used by copperplate printers. 3. A stereotype or electrotype page. This is the most common use of the word. 4. An illustration of any kind inserted in a book.

Plate-Marked.—The impression mark of the outer edge beyond the printed part of a copperplate.

Plate-Paper.—1. A heavy, spongy paper manufactured expressly for printing from incised plates. It receives the most delicate lines freely and takes the impression of printer's ink readily. 2. A soft paper of good quality used for wood-cut printing.

Plate Printing.—This term is now commonly applied to the description of printing formerly called copperplate printing, the name having been changed in consequence of the general substitution of steel for copper plates. It differs radically from typographical printing in the fact that the hollows of the plate used, instead of its elevations, are reproduced on the printed sheet, the philosophy of the process being that pressure on the elasticity of cloth blankets forces moist paper to enter the indentations of a plate and take up all the black ink from it. The surface of the plate, after being supplied with a more liquid ink than that used in typographic printing, is carefully cleansed before each impression so that no ink may be deposited upon the paper printed except that which sinks into the depressions of the plate. Plate or copperplate printing continues to furnish the highest type of artistic excellence, no other system of printing being capable of producing specimens equal to first-class mezzotint and line engravings.

Platen.—In a hand-press the piece directly over the type which gives the impression to the pages when forced down upon them. In a wooden hand-press this was made of mahogany, nineteen inches long, thirteen inches wide and four inches thick. Its long way was transverse to the bed of the press. When the form was printed only one-half of it was under the platen at once, and after that had been pulled and the pressure taken off the bed was moved in a little farther and another pull taken. The size of the bed was medium, or nearly that; the size of the platen was half-medium. On the upper side of the platen four iron hooks were placed, which served to attach it to the hose. In the centre on top was an iron plate eight inches long, four inches broad and a quarter of an inch thick, which had in its centre another frame half an inch high. The end of the spindle moved in a brass platen pan centred with one of steel. The platen of an iron press is only a little smaller than the bed. In an Adams press the platen is immovable and the bed is forced up against it.

Platen Machine.—A printing-machine which has a flat and not cylindrical impression.

Platina (Sp.).—The bed of a press; also an imposing stone or plate.

Platine (Fr.).—Platen.

Platten.—Another mode of spelling the word platen.

Playing-Cards.—One of the oldest forms of printing, preceding typography by a number of years. By an old decree of the Senate of Venice, dated in 1441, it seems that the "art and mystery of making cards and printed figures" which had been in use in that city had fallen to decay in consequence of the great number of printed playing-cards which were being made outside of Venice. Before 1449 the art was practiced in Ulm, Augsburg, Nuremberg and probably elsewhere. Cards may have been produced by stencil, but it is more probable that they were printed by the ordinary wine-press. The ruder kinds were in black only, but the finer were colored, either by hand or by stencil. The rude forms now in use on the court cards are copied after designs of the day, about the year 1500. They have remained substantially unaltered up to the present time, although many artists and engravers have tried to introduce more modern figures. Cards are now manufactured only in places which make a specialty of this business, comprising in the United States not more than eight or ten establishments. In most countries of the Old World the manufacture is a monopoly, from which the government reaps a profit. In the United States almost all of the processes are executed by machinery, and nowhere has there been shown greater care in making cards even, smooth and bright. Inequalities which could not be noticed by most people would interfere with cutting and shuffling among those who make their livelihood by games of cards, and the manufacture must be of so high a degree of excellence that no exception to them can be taken. The processes as carried on in the great card factories are to a large extent secret, and in describing the manufacture the details will be given as they are where much hand-work is intermixed.

The cardboard consists of several thicknesses of paper, each large enough for forty cards, if for the plain cards of one pack, or of twelve cards, if for the court cards. They may also be for the whole fifty-two. The French and Russian cards are often very thin, but those made in England and America are in fourfold thickness—two sheets of coarse paper to form the foundation and two of finer texture for the fronts and backs. All of the papers are purposely selected in reference to certain desirable qualities, especially those for the front and back, which must take paste and paint well and must polish well. The sheets are opened out on a table, and the paste is applied with a large, soft brush. The two inner sheets to form the foundation or main substance are, when pasted together, subjected to processes of cool drying, warm drying and hydraulic pressure until they become a thin, smooth, tough sheet. The sheets for the fronts and backs of the cards undergo much preparation before they are pasted on. If the cards are to be white the paper receives a kind of silicious or enamel coating, in order that the black and red pips of the plain cards and the gay colors of the court cards may come out sharp and clear. If the cards are to have colored backs, a ground color and one or more pattern colors are laid on with a brush. The outer sheets of paper when thus far prepared are pasted to the foundation, and then the fourfold paper, now become cardboard or carton, is dried and pressed in various ways until it becomes dense and compact in surface. The fronts or faces of the plain cards are simple enough; they represent merely red and black pips, the numbers varying.

Games of cards have been devised in some countries in which the number of cards has varied from seventy-eight to a hundred and twenty; but the almost universal number now is fifty-two, of which forty are spotted or pip cards, while the remainder are court cards. In England and America cards are in four suits—hearts, diamonds, clubs and spades, two red and two black. For the sake of near-sighted persons Messrs. De La Rue some years ago introduced four colors for easier distinction. They were red hearts, blue diamonds, green clubs and black spades. The public, however, did not receive them with favor. The printing is done upon a cylinder press, the designs being upon electrotype plates. There are, however, peculiarities in the mixing of the ink in order to give it more lustre than usual. Polishing the cards is required to bring out their true brilliancy. Hot plates, rollers and polishing surfaces are all employed for this purpose. Imperfect cards are not sold by first-class makers to their trade, but are disposed of to dealers who make a specialty of this kind of cards, and are then sold to the public without a manufacturer's label.

Piecas (Sp.).—Rules.

Plegadera (Sp.).—Folder, folding-knife; the piece of metal or bone used by press-feeders.

Pli (Fr.).—Fold.

Pliego (Sp.).—Sheet; pliego de aceite, oiled sheet placed on a cylinder to prevent offsetting; pliego de comprobar, revise sheet; pliego de prensa, press-proof; pliego de principios, sheet containing the introductory matter of a book.

Plier (Fr.).—To fold.

Plomos (Sp.).—Pieces of lead placed in the fountain of a press to confine the ink to a certain space; plomos de cargar, leaden weights used to press the paper after wetting.

Plow.—The instrument used for cutting the edges of a book when it is in the lying-press.

Plow-Knife.—The knife attached to the plow.

Plugging.—Repairing or altering a wood-engraving and replacing the imperfect spot by inserting a plug, which is dressed down to the surface to be newly engraved upon.

Plus.—The copies left beyond any given number in printing off.

Plus Mark.—A sign in arithmetic, meaning in addition to; thus: +.

Poético (Sp.).—Name given to a Roman letter of a somewhat condensed face.

Poetry.—Setting poetry is attended with some difficulty, and much is seen in print which has not been properly composed. The lines should be as near the middle of the page as possible. Were every poem so written that each line had a like number of syllables there could be no difficulty in deciding upon the indenting, as the space in the stick would average alike; but in verse, such as Sir Edwin Arnold has lately contributed to the World newspaper, or like Southey's Thalaba, no such computations can be made. Where matter of irregular length or unequal syllables rhyme together or are interspersed among each other each portion is to be regarded as a whole, and each line must be regulated by its relation to the others. The longest line goes in the centre of the page, always having even ems before it. If one measure abruptly changes and a succession of shorter or longer lines follow, the latter take new indentations. Lines which rhyme with each other are indented alike.

The easiest to consider is the ten-syllable or eight-syllable measure, in which each line rhymes with that which succeeds. The following, from Bradford's tombstone, is an example:

Reader, reflect how soon you'll quit this stage;
You'll find but few attain to such an age.
Life's full of pain. Lo! here's a place for rest.
Prepare to meet your God; then you are blest.

Scott, in a tribute to Dryden, shows the eight-syllable measure:

And Dryden, in immortal strain,
Had raised the Table Round again,
But that a ribald king and court
Bade him toil on to make them sport;
Demanded for their niggard pay
But for their souls a looser lay,
Licentious satire, song, and play.

The lines which follow are part of a religious poem published in 1752:

Great blest Master Printer, come
Into Thy composing-room;
Make, O make our souls and senses
The upper and the lower cases;
And Thy large alphabet of graces
The letter, which being ever fit,
O haste Thou to distribute it.

The most common form of verse is when the second and fourth lines rhyme. An example of this is given from the pen of James Beatty, a delegate to the seventeenth session of the International Typographical Union:

The blossoms from the dahlia fall,
  Like snow-flakes, o'er the garden lane;
The blue-eyed violet droops and dies
  That loving hands were wont to train.
Alone the purple aster blooms
  Amid the dead leaves round it blown;
Whilst o'er the meadow bleak and bare
  The north winds surge with dreary moan.

The same rhymes are shown in a larger and a shorter measure in verses by Bulwer:

By the muddy crossing, in the crowded streets,
  Stands a little maid with her basket full of posies,
Proffering all who pass her choice of knitted sweets,
  Tempting Age with heart's-ease, courting Youth with roses.

Age disdains the heart's-ease,
  Love rejects the roses;
London life is busy—
  Who can stop for posies?

The irregular stanza gives the most difficulty. Length of line and rhyme must both be considered. The following is from the Printers' Register of 1878:

A song to the Press, the Printing-Press!
Of the good old-fashioned kind,
Ere the giant machine, with its pulse of steam,
Elbows it out of mind.
In the days of yore
Our fathers hoar
By his sturdy limbs have wrought;
Of iron or oak,
His teachings spoke
The language of burning thought.

Another irregular verse is as below. It is from the pen of William Oland Bourne, a poet and printer of New York, and is addressed to S. F. B. Morse:

O wondrous Hand!
That caught the subtle spirit of the skies,
And down the silken wire
Led on the living fire
To meet the passion of his watchful eyes—
And with one spark of light,
To pour upon the sight,
A world of rapture as it onward flies!

One form of poetry now much used is the five-lined stanza, as follows:

No good, of worth sublime, will Heaven permit
  To light on man, as from the passing air;
The lamp of Genius, though by Nature lit,
  If not protected, pruned and fed with care
  Soon dies, or runs to waste with fitful glare.

Blank verse is set with uniform indentation when in the ordinary ten-syllabled line; but occasionally a fantastic metre is adopted for this, giving in one place a few syllables and in another many. They must be arranged according to length of line when the discrepancy is very great. The following extract from one of the English translators of Homer will exhibit the ordinary form of blank verse:

Thus as he spake, great Hector stretched his arms
To take his child; but back the infant shrank,
Crying, and sought his nurse's sheltering breast,
Scared by the brazen helm and horsehair plume,
That nodded, fearful, on the warrior's crest.
Laughed the fond parents both, and from his brow
Hector the casque removed, and set it down
All glittering upon the ground; then kissed his child
And danced him in his arms.

It should be noted that there are occasional rhymed lines in the blank verse of the great authors. Frequently a stanza ends with them.

The six-lined stanza is also much used. Dyer's well-known lines in this form read thus:

My mind to me a kingdom is.
  Such present joys therein I find
That it excels all other bliss
  That earth affords or grows by kind:
Though much I want which most would have,
Yet still my mind forbids to crave.

Another form of verse is as in Ben Jonson's well-known song:

Queen and huntress, chaste and fair,
  Now the sun is laid to sleep;
Seated in thy silver chair,
  State in wonted manner keep.
    Hesperus entreats thy light,
    Goddess excellently bright.

The variation occasioned by fewer syllables in a line is well shown in the following from Punch. The Amperzand is the short and, or the twenty-seventh letter (and, per se, and):

Of all the types in a printer's hand
Commend me to the Amperzand,
For he's the gentleman, seems to me,
Of the typographical companie.
  O my nice little Amperzand.
  My graceful, swan-like Amperzand,
  Nothing that Cadmus ever planned
  Equals my elegant Amperzand!

When a line is longer than the measure it turns over into the next one, being then indented enough to prevent it from being confounded with the other lines. If the measure is very long, as for instance fourteen syllables, it will turn over in any ordinary newspaper and in most books not of especial width. Blank verse often has a redundant syllable, sometimes two, and in some cases even three, thus making the lines very long. It is not an infraction of good taste in an elegant book if such lines cannot come in to allow them to project slightly into the margin, as we now do with pictures. This is only in case where there is not more than a line or two of such length in a page. Indenting on solid matter for the lines which do not rhyme with the first is usually an em, but in leaded matter two ems or an em and a half are very often used. In irregular verse some printers indent an em for each syllable which is omitted. It is usual in well-printed books in poetry to space between the words with an en quadrat, all lines being filled out in the blank portion, and no greater and no less spacing being used elsewhere. The views of printers in regard to this usage vary. Some would employ nothing larger than a patent space; others think two three-em spaces are not too much in double-leaded matter. Initial letters may be used in poetry, and notes can be attached to any part which requires explanation. In a regular measure, where a succession of lines follows the same rules, it is usual to consider quotation marks as coming before the line proper, and the capital which begins lines with the capital which begins the answering line. In some hymn-books long lines of thirteen, fourteen and fifteen syllables, which are really eights and sevens, two sevens and sevens and sixes, are divided into two, the second line taking no capital. The omission of capitals has also been followed in some Latin books, on the ground that the ancients did not follow the custom of capitalizing. This theory would leave out the spaces between the words, because Cicero and Catullus wrote in one long line. It is not considered in good taste in setting poetry to Italicize freely, nor to use small capitals. Between each stanza or verse in solid matter a blank-line is usually employed; but if leaded the additional lead is also given. When in dialogue one verse ends short and the interlocutor also has a short line at the beginning, the two short lines making one of the regular measure, it is usual to begin the indentation on this second verse on a line with the ending of that preceding it. Very narrow measures of poetry on a wide page should be set up in a narrow stick, and the redundant margin should be supplied with metal furniture.

All verse is not constructed so smoothly and with the metre so accurately shown and the accent so well defined as in Gray's Elegy or in Poe's verses. Shakespeare, Burns, Pope, Dryden, and in fact nearly all of our great authors, have lines which cannot be scanned, imperfect rhymes and wrong accents. The compositor and proof-reader should therefore be careful in regard to alterations and emendations. Every part of every poem is not filed up and polished, and the reader desires more to know what the author says rather than what he might say if he had spent much more time and patience upon his lines. Writers in verse are allowed many licenses. They place the adjectives after nouns, abbreviate words and elide vowels, use old words and antiquated forms of them, and apply them in unusual senses. All of these are permitted, thus making the printer's task much more difficult than it would be with the clear and perspicuous prose of Cobbett or Sydney Smith.

In no description of matter is there greater liability to error than in poetry. There are so many unusual words, and they are employed in so many strange senses that this is not to be wondered at. Unusual care and patience must therefore be exercised by the printer, and words which are strange must not therefore be decided to be errors except upon conclusive proof. After reading the galley in the regular way and correcting the ordinary and most obvious errors it should be revised and read a second time. The next step is to collate the whole. The proof-reader takes the copy in one hand, reads a line, and then examines the revise to see that it conforms exactly. When a strange word is found it should be looked up in a dictionary. It probably will be discovered there, but may not be. One great source of error is in the substitution of one word for another. The boy may read the copy correctly, but the proof-reader understands it as something else. Thus cheat is substituted for chief, fame for fane, or seat for seed. There is a continual tendency to imagine that the word read is of common instead of uncommon use, and sometimes the wrong word makes as good sense as the original, if not better. Thus in a poem of Cowper the line

Some boundless contiguity of shade

is often printed

Some boundless continuity of shade.

The latter might seem the better and more reasonable wording, but it is not that of the author. Where words are used out of their common meanings the manuscript should be strictly examined to see whether the word which the compositor has used is really that written. If the author understands versification well the metre should also be considered, as that would frequently give the clue to the doubtful word. The author should also have the proof at least twice. If he cannot read it, on account of distance or illness, he should name some friend who will give the proof scrutiny.

Poignée (Fr.).—A handful.

Poinçon (Fr.).—A punch.

Point Holes.—The punctures made in the sheets by the pins or spurs of the points.

Point Screws.—Screws for fastening the points on the tympan.

Point System.—See STANDARDS OF TYPE.

Point-et-Virgule (Fr.).—The semicolon.

Pointe (Fr.).—A bodkin.

Pointer.—The layer-on on a machine who points the second side of a sheet in printing.—*Jacobi.*

Points.—1. Needle-like projections from the tympan which penetrate the paper. After the first side is worked off the sheets when turned are placed on the same points, which insures a perfect register. 2. The marks of punctuation. See PUNCTUATION.

Pointures (Fr.).—Points.

Pole.—A slang expression for a wages bill.—*Jacobi.*

Polea (Sp.).—Pulley; also the rolls or small wheels of the rollers, &c., in machine presses.

Poles.—A series of wooden supports used in drying printed work.

JOHN POLHEMUS.

Polhemus, John, a printer and publisher of New York, was born near Haverstraw, Rockland County, N. Y., on December 15, 1826. He was first employed in a cotton factory, and afterwards upon the Morris and Lehigh canals, going to New York and entering a printing-office in 1842. He soon distinguished himself as a skillful hand-press man and afterwards as a power-press man. In 1852 he entered into partnership with John De Vries, as Polhemus & De Vries, at 66 Cortlandt street, their work being chiefly auction catalogues. By laboring long hours, frequently being at work until 3 or 4 o'clock in the morning, some capital was accumulated, and in 1865 the partners separated, Mr. Polhemus taking new quarters at 102 Nassau street. There he originally occupied only the top floor, but as business increased he added those below it. He began at once the policy of accumulating type so that he might be provided for emergencies. Often his purchases have exceeded twenty thousand pounds in a year. His class of work has been law, periodicals and tabular and statistical work. Lately he removed to 121 Fulton street. He was a member of the original Typothetæ, founded in 1863, and on its revival in 1883 again joined. He has been its treasurer and the chairman of the executive committee, and has been a delegate to all of the annual conventions, except the first. At the session held in New York he acted as the host, being constantly in attendance on behalf of the entertainment committee. In 1891 he visited Europe, and on his return was handsomely entertained by his friends at a banquet on September 22, 1891.

Police (Fr.).—The list of the various kinds of letters which make a font.

Polish Language.—This consists of twenty-four letters, q and v being omitted. They are used only in foreign proper names. Many accents are used, peculiar to that tongue, in addition to the ordinary accents. These are b, c, l, m, n, p, s, w and z. There are two forms of the latter letter. All of those above given take an acute accent, except the l, which has a crossbar near the top. In the capital form it has a close resemblance to the pound sterling mark. The language bears much analogy to the other tongues of the Slavonic group. Much has been written in Polish, but at the present day, owing to the repressive policy of the Russian Government, there are few writers of note. The centres of Polish literary activity, and especially of periodical literature, are Warsaw, Wilna, Posen, Cracow, Lemberg and Paris, the latter as the chief seat of the Polish emigration. There are several Polish newspapers issued in the United States, there being 8 in Illinois, 3 in Michigan, 1 in Minnesota, 3 in New York, 2 in Ohio, 3 in Pennsylvania and 1 in Wisconsin.

Polisher.—A steel instrument used in bookbinding for giving a gloss to the leather after finishing.

Póliza (Sp.).—Type-founder's scheme or schedule.

Polizza (Ital.).—The bill of type; the whole quantity of a duly assorted font.

Polling Backwards.—When a compositor designedly retards the finishing of his copy in order to secure a better take next time, even though he may lose more in the end by idling, it is called polling backwards.—*Jacobi.*

Polyautography.—The act of multiplying copies of one's own handwriting or of manuscript by printing from stone; a species of lithography.

Polyglot.—A book printed in a number of languages. This was formerly regarded as a very desirable way of uniting various versions for the sake of comparison, but modern scholars as a rule now prefer to have their languages separated, each in a separate volume. Almost the only work for which much polyglot printing is done at the present day is the Bible. Here the language requires to be critically studied, and a comparison with another version will sometimes instantly clear up a difficulty. Bagster of London is the largest publisher of polyglot Bibles. He issues one edition in eight languages. In the printing of polyglot works, when two or more versions of the same work are on one page in parallel columns, each paragraph begins on a line with the other paragraph in the other part. If one of the texts is more important than another it may be in large type, wider measure and leaded, while that which is less important is solid, in small type and narrow measure. In three languages it is usual to put the main text in the centre and the others at each side. With four languages two would be at the top and two at the bottom; with five the main text at the top or in the centre, and the other four ranged around it. Should any printer to whom this work is unfamiliar receive an order to print a book of this kind he will find it worth while to visit a theological seminary and ask the librarian for permission to look at some of his polyglot books. Some of these are miracles of typographical ingenuity.

Polyglot Founders.—Those founders who alone were authorized to cast type by the decree of the English Star Chamber. Four persons were named.

Polytype.—When a number of letters are cast together, each to be separated afterwards. It has been thought by many printers that this would be an easy method to make type, as twenty or thirty could be cast together and then sawed apart. A distinguished Philadelphia printer spent many thousands of dollars in attempting to accomplish this feat, but failed, as the bodies could not be so sawed out as to leave them perfectly square to each other, and it was also difficult to give them the proper margin at the side, thus placing the letters at a suitable distance apart. The word polytype has also been applied to a stereotype process and to a method of making logotypes.

Ponctuation (Fr.).—Punctuation.

Portada (Sp.).—Title-page.

Porta-Página (Sp.).—Porte-page, page-carrier. A card or sheet of paper placed under pages to facilitate handling them.

Porta-Pagina (Ital.).—A piece of pasteboard or several thicknesses of paper upon which the packet or page is laid so that it may be moved or put away.

Porter, George U., was born in Baltimore, Md., in 1822, lived there all of his life, and died there on July 4, 1886. In 1841 or 1842 he was appointed manager of the Merchants' Exchange and News Rooms, which for many years were the shipping and commercial headquarters of the city. In 1850 he established the Baltimore Journal of Commerce. A few years afterwards he established a weekly letter-sheet and the Price-Current printing house. In 1852 he was elected first secretary of the Board of Trade. In 1860 he was appointed a member of the Water Board of Baltimore. He was uninterruptedly and actively connected with these six positions to the day of his death; and in addition thereto he was for twenty-seven years the commercial editor of the Baltimore Sun. He was also interested in the Daily Produce Report.

GEORGE U. PORTER.

In 1874 William Pinkney Hamilton, now of the firm of Howard Lockwood & Co., New York, became an equal partner with Mr. Porter in three of his enterprises, and continued as such for five years.

Portsmouth, N. H.—In 1755 several influential inhabitants exerted themselves to establish a press at this place. Daniel Fowle, who had been arrested and imprisoned in Boston on a charge of having published a libel against the government of Massachusetts, removed to Portsmouth in 1756. His nephew Robert was taken in partnership in 1764, but ten years later the firm was dissolved, Daniel continuing in business until his death, in 1787. Furber & Russell had a second printing house.

Portugal.—Printing is supposed to have been introduced into Portugal about 1470 or 1474, Leiria being the first town in which the art was practiced. It was introduced into Lisbon about 1489, which is the date of an edition of the Hebrew Pentateuch, thought to have been issued in that city. The first printers, as in most European countries, were Germans, who brought with them their presses and type. In the sixteenth, seventeenth and eighteenth centuries, however, the German masters had disappeared and the business was entirely in the hands of native proprietors. The National Printing-Office at Lisbon was founded in 1768 by the Marquis of Pombal. As first projected this was intended partly as a school for the art where every branch could be learned by young men. This intention was not at once carried out; but later the plan was more fully developed. The history of the National Printing-Office is nearly coincident with that of the art in general in Portugal from the time of its organization, since from its position as a protected government institution it held for many years almost a monopoly of the printing of the country, not confining itself to government work, but taking contracts from private publishers and others whenever it could get them. The production of playing-cards was secured to it absolutely until 1833, and brought a considerable income to the king's coffers; but this branch declined rapidly in consequence of private competition after the removal of the monopoly in that year. The first manager of the national office, Miguel Manescal da Costa, directed its affairs for thirty-two years, and on his death a commission was appointed to conduct it. After an extended trial this was found unsatisfactory, and it was again placed under the management of one person, A. da Costa, an energetic man, who introduced the first Stanhope press. It was during the troublous times of 1802 that the government established the first paper-mill; but the royal family were obliged to retire to Brazil, where the seat of government was set up, and the mill had hardly got started when the whole plant was destroyed by the invading army of Napoleon. It is only within recent years that this industry has been revived by private parties.

About 1836 lithography in a crude form was introduced, and languished in a backward condition for many years. In 1843 the first cylinder press was set up and a letter-foundry was added about 1844; stereotyping and electrotyping outfits were also put in later, but the business was much injured by the competition of French founders, who opened branches in Lisbon in 1850.

It is claimed that the technical school in connection with the national office has been of great benefit to the craft in Portugal in elevating the standard of the workmen and of their product by a thorough education in all the branches of the art. Of late years the business has suffered much from foreign competition, as has been the case with Spain; and the recent financial distress of the country, together with the establishment of the republic in Brazil, has well-nigh ruined the publishers and printers alike.

Few trustworthy data are obtainable relative to Portuguese periodicals either in Europe or America. In the United States there have been a number of newspapers started, but the population which should support them is too small and unstable to make them successful. At present the only publications are two issued in New York, one in Massachusetts and two in California.

Wages in Portugal are in the best offices for foreman per day, $1.55; compositors, 62½ to 83 cents; apprentices, 35 to 41 cents; foreman of the pressroom, $1.35; pressmen, 54 to 72 cents; laborers, 45 cents; bookfolders and binders, 62 cents; apprentices, 31 cents. The hours of work are nine a day, and all work is done on time. Each man is supposed to do a job a day, or two pages of bookwork, consisting of eighty to one hundred lines. In most offices men work half of Sunday, generally at distribution or clearing away.

Portuguese Language.—The relationship between the Portuguese and Spanish languages is so close that the general rules for one are with few exceptions applicable to the other; it will therefore not be necessary to note here more than essential differences, as the remarks under the head of SPANISH LANGUAGE will cover points not mentioned.

The Portuguese alphabet consists of twenty-five letters, which are the same as in English, except w, which is used only in a few foreign words. No fixed system of accentuation has as yet been adopted, but the following marked letters are generally employed: á é í ó ú, â ê ô, ç ã õ. The two latter indicate nasal sounds; while the cedilla (ç) gives the letter c the value of s before a, o or u, as in French. Ordinarily the accents are not much used on the capital letters; É (is), however, is required to distinguish from E (and), while Ã, Õ and Ç are considered essential. The combinations lh and nh have the same value as the Spanish ll and ñ or the French liquid ill and gn, and being considered as equivalent to a single letter must not be separated in dividing words at the end of a line, as tra-ba-lho, com-pa-nhia. The general rules for division are the same as for Spanish and French; but in many words silent letters are retained, which must be carried over with the following consonant, e. g., fru-cto (pronounced fru-to), dis-tri-cto. es-cri-ptor, Ma-gda-le-na, cons-tru-cção, &c. Neither must ch nor the liquids l and r preceded by another consonant be divided: en-chu-to, la-drão, li-vro, tem-plo, &c. On the other hand, s followed by another consonant should be separated in divisions, even though it may form part of a radical component of the word:

cons-tan-te, es-plen-dor. Th, being sounded as a simple t, must not be separated: ca-tho-li-co, &c.

The Portuguese case is laid similarly to the Spanish, the extra accents being accommodated in the upper right-hand side.

Post.—A size of printing-paper, 20 by 16 inches.—*Jacobi.* In America folio post is 17 by 22 inches, and according to one English authority there are two sizes of post used in England, large and small post; the former is 16½ by 21 inches, and the latter is 15¼ by 19½.

Postage-Stamps.—Adhesive stamps applied to letters. They have been in use in England since about 1840. In 1847 Congress first authorized their use in the United States. They were of two denominations, five and ten cents, the former bearing a portrait of Franklin and the latter of Washington. In 1851 postage was reduced to three cents, and a new series of stamps came in. There were many in the possession of Southern postmasters when the war broke out, and a new issue was provided in 1861. Since that time many new designs have been made consequent upon reduction of rates and demands for different purposes. During the three years after stamps were first introduced, from 1847 to 1851, only about 4,000,000 of them were sold. In 1852, after the three-cent postage was introduced and prepayment was made compulsory, 54,000,000 stamps were then required. These cost the government a little more than seven cents a thousand. Stamped envelopes are regarded by the Post-Office as better than envelopes to which a stamp has been affixed, as it obviates the danger of the latter falling off in the mails, and it also lessens the number of letters which go to the Dead-Letter Office. The first stamped envelopes were issued in 1853, and were of the denominations of three and six cents, and in 1855 the ten-cent stamped envelope was added. In 1860 there was a new series, including a one and a four cent stamp, and at the outbreak of the war a new series was required. There are now seven sizes of stamped envelopes on three different qualities of paper. Stationers and printers have justly objected to the competition of the government with them by the manufacture of these envelopes and the printing of a return request. The support of the government is obtained by taxation upon the people of the United States, and it is surely unjust and unequal, after taking the money of the trade, to enter into direct competition with it. The government not only makes these envelopes and sells them at the cost of production, but prints the return request gratuitously when an order is given for a certain number. This practice has now been followed for years, although Congress has been memorialized against it by boards of trade, stationers and Typothetæ societies, but so far without avail.

Stamped newspaper-wrappers are also furnished by the Post-Office Department. The first design was adopted in 1861, the department selling 1,000,000 wrappers during the first three months following the issue. They originally had only a two-cent stamp. In October, 1870, the one-cent stamp was added.

Postal-Cards.—Cards issued by the Post-Office authorities designed to have a message written on one side and an address on the other. They are very largely printed upon, and work upon them constitutes a considerable portion of the jobbing done by a printer. The first were used in Austria in 1869; in Germany, England and Switzerland in 1870; Belgium in 1871; Norway and Russia in 1872, and in the United States in May, 1873. They became very popular at once. During the first two months of their use in the United States 31,000,000 were used, and for the following year the amount rose to 90,000,000. In 1878 the number rose to 200,000,000; in 1890, 386,000,000; and in 1891 to over 400,000,000. The government gets these cards made for thirty-five cents a thousand, or at the rate of thirty for a cent. Lately three sizes have been made.

Postal-Tubes.—Tubes of various sizes, made of paper or thin strawboard, for protecting paper or prints going through the post.

Postcard Size.—The official size for inland cards, which in England is 4¾ by 8 inches; for English foreign cards, 5½ by 3½ inches.

Poster.—A printed bill of a large size. By a discussion which appeared some years ago in Notes and Queries it appears that the name arose from the practice of affixing bills to the posts in front of the theatres, taverns and public offices. They must then have been very small compared with those at present made. The regular size for posters is now 28 by 42 inches, and it would be regarded as incorrect to use the term as applied to anything smaller than half of this size. Some posters are printed on a larger size of paper than that given above, but most large posters are now on two, four, six or eight sheets, printed separately but put together by the bill-poster at his stands. Sizes as large as thirty-two single sheets are known. The printing of posters of large size is usually in the hands of establishments chiefly devoted to this purpose, as special type, borders and cuts are required, and the customers are different from ordinary commercial men. A single or double sheet can be executed in most job offices of size. Twenty-four or thirty line pica is large enough for a single-sheet poster, and wood type of this dimension is kept on hand by most printers. With each successive enlargement of the size of the bill larger type is demanded, until single letters are made of the magnitude of the entire bed of a press. Letters five feet high have been cut, but this would be very exceptional. All concerns doing theatrical printing need type three feet high and a great quantity of the sizes below that. Usually the very largest sizes of an office are somewhat condensed. Metal type is not made of a greater size than twelve-line pica, and above four-line pica wood type is usually the cheaper. In small offices which do single-sheet posters a pair of cases of double small pica, or some heavier face than Roman, are needed for the body of a bill. In larger offices double English and double great primer should also be provided, each in two cases. Very large bills having much typesetting are usually electrotyped or stereotyped in sections and then blocked, as no office could afford to keep up the quantity of type needed for such a purpose in the hope that it might occasionally be employed. An office devoted to posters usually has many cuts of its own and regularly employs an artist to make drawings for it and an engraver to cut its designs, which are usually on pine wood and can be engraved very rapidly. Lines and dots, of course, must be in accordance with the magnitude of the engraving. In such places also words and lines made up of words are engraved in answer to special demands. Lithography has of late made vast inroads into the printing from pine blocks.

The houses which execute large posters in the letter-press way are very few, probably not exceeding thirty in the Union. They need much capital, and they must be good judges of men, for theatrical and show managers, who are their best customers, are not sound risks in the same sense as publishers or merchants. Each company has a great variety of printing executed before the beginning of the season, supplemented by some as it is going on, and the requisite amount is sent to the manager from time to time as he directs, or according to an itinerary he prepares at the beginning. Besides this, individual actors often require printing. Much of the work is executed in colors. In making estimates for posters consideration should be given to the fact that they require much more ink than any other kind of work, as a poster which cannot easily be read at some distance is not a good poster.

Poster Chases.—Large chases without crossbars adapted for broadside work.

Poster Stick.—A long wooden composing-stick.

Poster Type.—Large, heavy types, suitable for posters. Between two line and twelve line they may be of wood or metal. Above that size they are always of wood, and below two line are always of metal. A German type-founder, Herr Pappelbaum, has invented brass poster types. They are said to be light, durable, nearly as cheap as wood, and accurate in body, height, lining and width. They are unaffected by moisture or atmospheric changes, and are easily cleansed.

Posteta (Sp.).—The quantity of printed sheets placed to dry.

Postilla (Ital.).—A side note or cut-in note.

Pot.—A size of writing-paper in England 15½ by 12½ inches; printing paper, 16 by 13 inches. The latter is also made and sold of double size.

Potajeria (Sp.).—Name given to the signs, &c., which, not being frequently used, are not kept in the ordinary cases.

Potash.—An alkali used in solution, much diluted, in printing-offices, for dissolving the ink spread upon the type.

CHARLES POTTER.

Potter, Charles, a press-manufacturer, commonly known as C. Potter, Jr., to distinguish him from his father, whose name was the same, was born in Madison County, N. Y., on April 21, 1824, but from his thirteenth till his twenty-second year his residence was in Jefferson County of that State. In 1846 he removed to Westerly, R. I. In 1855 he began as a maker of printing-presses, his first venture in that line being a press for printing in colors, invented by George H. Babcock, the boiler-manufacturer. He also built the Davis oscillating press. He continued in manufacture until the close of the Rebellion, although he had not yet succeeded in building up a profitable business and was considerably in debt. In 1864 he stopped the manufacture of the oscillator and devoted himself entirely to the making of cylinder presses. The business then rapidly increased, and in 1866 he was able to pay off all his indebtedness. In 1879 he associated with himself Horace W. Fish and J. M. Titsworth, and later D. E. Titsworth, the firm being for years C. Potter, Jr., & Co., but at present the Potter Press Company. The works are at Plainfield, N. J. Many varieties of presses are produced. Mr. Potter has been a leading member of the Seventh-Day Baptist Church, a trustee of the principal seminary of that denomination, Alfred University, at Alfred, N. Y., and a liberal benefactor to it, having endowed the chair of history and political science.

Pound Mark.—1. An arbitrary mark, £, used to denote a pound sterling or other pound value in money. In old American books accounts are kept in colonial pounds, that of New York being worth $2.50. The mark is derived from the Latin libra, a pound. 2. A mark, ℔, derived like the other from the Latin libra, but employed in measurements of weight. This mark is alike in the singular and plural, never taking s in the latter case. Neither does it require a period to show that it is an abbreviation.

Poussière du Papier (Fr.).—The face of the paper, the outside filaments.

JAMES W. PRATT.

Pratt, James W., a printer of New York, was born in Queen's County, Ireland, on February 8, 1834. He entered a printing-office at an early age, but his first employer having died before the expiration of his apprenticeship he finished his time in the office of Porteous & Gibbs, Dublin, in the year 1855. In the fall of the same year he came to New York. He was employed in various houses in New York until 1858, when he went to Philadelphia, where he was engaged in the type-foundry of L. Johnson & Co., there having charge of the job-type department. He returned to New York in the early part of 1860, and in the fall of that year began business for himself. For many years he was at the corner of Gold and Fulton streets, but is now at Ferry and Gold streets. He was an original member of the Typothetæ of New York, has been a member of its executive committee for the last six years, and was a delegate to the conventions of the United Typothetæ at Toronto and Chicago. In 1890 he was appointed by the mayor, although opposed to him in politics, as a commissioner to investigate the methods of printing employed by the city and suggest improvements.

Précis.—An abstract or compendium of a paper or document.

Preface.—The introduction or explanation of an author as to the origin or purposes of his book. It is always found at the beginning of a work, and is generally short. In some cases, however, a preface would well make a treatise of itself. It is the usual rule to set prefaces in type one size larger than that employed in the body of the book, and occasionally it is set in two sizes larger. If it is comparatively short it is probably double leaded. When the space will admit the beginning is sunk a little more than is common in chapter-headings. If head-pieces are employed it is also proper to use one here. The pages are folioed with numeral letters instead of figures. The preface comes next after the title, the blank page after the title and the dedication and its blank. Sometimes it is set in Italic, and the lines generally run across the page, whether those in the body of the book do or do not.

Preliminary.—Any matter coming before the main text of a work—title, preface, contents, &c.

Première Ligne (Fr.).—Initial line, first line.

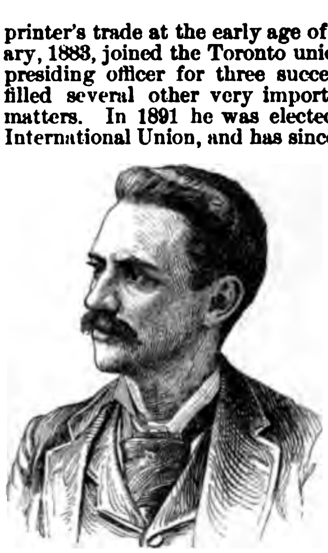
Première Page (Fr.).—The first page (of the text).

Prensa (Sp.).—Press. The term is usually applied to the hand-press; machine-presses being known as máquinas.

Prensista (Sp.).—Pressman.

Prentiss, John, the oldest printer and newspaper publisher in New England, died at Keene, N. H., on June 6, 1873. He founded the New Hampshire Sentinel in 1799, and conducted it for forty-nine years. At his death he was ninety-five. This is perhaps the greatest example of longevity among printers in the United States.

Prescott, William B., president of the International Typographical Union, was born in 1864 at Thornhill, near Toronto, Ontario. He was apprenticed to the printer's trade at the early age of thirteen, and in February, 1883, joined the Toronto union, of which he was the presiding officer for three successive terms. He also filled several other very important positions in labor matters. In 1891 he was elected the president of the International Union, and has since been twice re-elected. He is the youngest man who has ever occupied this position.

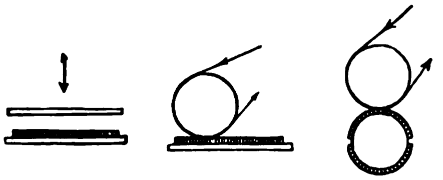


WILLIAM B. PRESCOTT.

Presión (Sp.).—Impression or pressure of the platen or cylinder on the form (also termed apriete).

Presque Unique (Fr., almost unique).—A print or book of which it is believed there can be very few copies in existence, perhaps not more than two or three. A rare book, if at all desirable, is worth much more than a book of which many copies exist. Unique is when only one copy is known, presque unique when not more than three or four exist, and very rare when a dozen at most could be found.

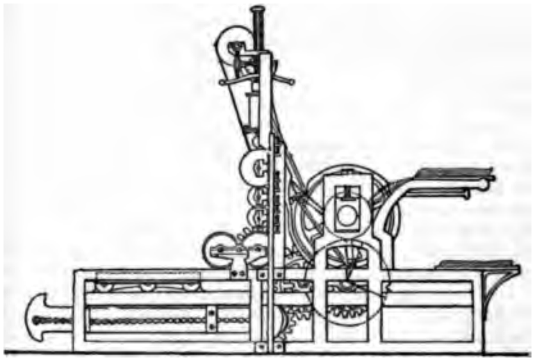
Press.—1. The machine or apparatus used in a printing-office for the purpose of giving an impression upon types or blocks which have previously been inked, and thus transferring it to a sheet of paper. There are many other kinds of press, but the above is the only one which interests printers, except the STANDING PRESS and the HYDRAULIC PRESS, which see. In England it has been the custom to restrict the term press to the earlier and simpler contrivance moved by a man's arm, while the larger and more complicated apparatus is known as machine. This use does not prevail in America; all are alike presses, distinguished when needful by the addition of a word, as hand-press or power-press. The HAND-PRESS is sufficiently described in the article with that heading, and this description will take up only the more elaborate mechanisms. They are roughly divided into letter-press and lithographic presses, the latter differing chiefly from the former in contrivances to moisten the form, different inking appliances, a greater distance between the bed of the press and its impression-cylinder, and contrivances to make unequal thicknesses of stones reach and touch the impression-cylinder where necessary. See LITHOGRAPHY. Letter-press presses comprise all of the remainder. They are jobbing, platen, cylinder, type-revolving and web presses. The last two are used almost exclusively on newspaper work, or at least on work where very rapid performance is desirable. Platen presses were once regarded as very desirable, but are now little required, while jobbing and cylinder presses comprise much the greatest part of those employed in ordinary book and job offices. All have come up since 1814, when the London Times was first printed by machinery.



PLATEN PRESS. CYLINDER PRESS. ROTARY PRESS.

METHODS OF IMPRESSION.

Printing increased very rapidly during the eighteenth century, and after it was discovered how colored rags could be made available for white paper, and how paper-making could be carried on at a tithe of the cost previously necessary, the editions of books and of newspapers were greatly enlarged. Desire of information concerning the state of Europe, the success or failures of Napoleon and the details of battles had much strengthened the newspapers in a pecuniary sense as well as increased their circulations. They were disposed to look favorably at any new invention which would enable them to increase their product, and to spend money on the hope that something would come of the investments thus made. It was impossible during the lifetime of Fox, Burke or Pitt to print more than six thousand copies of a newspaper on one side during the twenty-four hours. This would necessitate the constant movement of the press during the entire time, no respite being granted for meals or for stoppages. Such a feat might be performed by six men; but, allowing for sickness or for temporary absence, eight would be required. The second side would demand as many, and if composition was twice executed, as has frequently been done since, eight more would be needed, or twenty-four men in all, to get out six thousand copies of a journal within twelve hours after the last copy was set. England was engaged in a life and death struggle. Multitudes more of persons would have bought newspapers if they could have obtained them with sufficient promptness. In this attitude of affairs Friedrich König, a young German, arrived from his native country with the belief that he had solved the difficulty which would attend the construction of a mechanical press. Several English printers immediately engaged him in experimenting upon the work he claimed to be able to do, and in 1811 he printed on a press of his own construction a sheet of the Annual Register. It is believed by many English printers that König really had no success until he became informed as to the ideas of William Nicholson, a scientific man of repute, who a number of years before had taken out a patent for improvements in printing-presses, none of which, however, had he put into practice. In 1814 the Times succeeded in completing its press and the necessary arrangements, and the twenty or thirty pressmen of the establishment were pensioned off until they could get new places.



KÖNIG'S FIRST CYLINDER PRESS.

The results of König's success were immediately apparent. Able engineers analyzed what had been done and saw other methods of accomplishing the same result. The machine was much simplified, new ideas were evolved, and by 1824 the cylinder press, substantially as we now have it, had been devised. Its parts were not adjusted so nicely, little details needed looking after, the weight and strength required to be greatly increased, and the machine-shops demanded new appliances; but the central ideas were there.

In this line of improvement America did not lead. She waited until printers came from abroad who described what they had seen, and then imitated as well as she could the mechanism of which she had heard. The first American maker was Treadwell, who about 1820 was in England showing an improved hand-press. On his return to Boston he devised a power-press upon which one book at least was printed. His printing-office was burned down about 1824, destroying his machine, which is understood to have been a platen press. He was followed by Dow, Tufts and Adams, each having presses somewhat similar to the others. All of these were from Boston or that neighborhood. In New York the first press was made by the elder Booth, the grandfather of the printer now carrying on business in that city. In 1823 he printed a Murray's Grammar in a marble building which must have been in the neighborhood of Broome street. Treadwell's presses were adopted very early by Fanshaw of New York, the Bible Society and Tract Society printer, who employed Adams as his engineer. Many of Treadwell's ideas afterwards appeared in the Adams press, when it was finally brought out, about 1830. In 1825 or 1826 Major Mordecai Manasseh Noah, the leading writer of light editorials of his day, imported a cylinder press from Great Britain, upon which, however, the freight charges and duty were so high that the Major was unable to take the machine out of bond. Dwight, the editor of another paper, did this, set the press in operation and for several years two daily papers were printed by it. It is said that it was by his repairs to this machine that Richard M. Hoe, then a boy, first acquired his knowledge of power-presses. In 1829 Mr. Fanshaw mortgaged his printing-office to the Bible Society in order to obtain enough Treadwell presses to do the society's work, which had much increased. When he had obtained them they numbered ten, the size of each being a medium and a half. About 1830 Robert Hoe, the founder of the firm of R. Hoe & Co., began making cylinder presses, one of the earliest being used by Van Benthuysen in Albany, and another early one being employed on the Commercial Advertiser of New York. About this time also Adams began his work. These two firms continued for thirty years to manufacture nearly all of the presses in America, having only one competitor for any length of time, and having rivals for a few years only. The two did not compete, as Hoe did not make platen presses and Adams did not manufacture cylinder presses. Hand-presses continued most in use. In 1837 Harper & Brothers had thirty-seven hand-presses and one machine press, the latter not being much used. The establishment of cheap newspapers in 1833 gave fresh impetus to the manufacture of cylinder presses, and the latter soon required steam-engines to propel them, as, although man-power was sufficient, it was irregular and unsteady. The New York Sun was the first newspaper in America to make this substitution. At about the same time Fanshaw and Harper & Brothers employed a horse or a mule, elevated in the morning by tackle to an upper story and let down at night by the same means.

It was not expected in these earlier years that these presses would do the best work, or in any way equal the production of hand-presses. They were tried on newspapers, cheap pamphlets and almanacs, where the greater speed would make up for any falling off in quality. When they came in for other work it was the platen rather than the cylinder press which took the lead. Much printing was done upon the Adams press for book-publishers, and this continued the favorite with them until long after the Civil War. The cylinder press when it was employed upon job-work turned out its cheapest quality. While here and there printers did reasonably good bookwork upon cylinder presses before 1850, it was not until about that date that delicate work was attempted. In New York Oliver Brothers and Francis Hart began experiments in this line almost simultaneously. Paper had previously been wet down. They dispensed with it when possible, thus saving the time during which the paper was in preparation and that which was necessary to dry it and press it afterwards. Thus three or four days were saved. Dry printing had previously been practiced by William C. Martin upon the hand-press with success. When a job was thus completed the surface was much more lustrous and beautiful than when it had been wet and afterwards dried. Jobbing continued to be done upon dry paper with the cylinder more and more largely each year, until it was the exception in 1860 to wet down circulars, programmes or the like. During the previous decade job presses worked by the foot had been considerably employed, and their use during the war was much extended, as there were then two makes of a kind far superior to anything which had previously been known. Little job presses had been in use somewhat since 1830, but they had been uncertain. They broke down easily and were hard to repair. Among others were several varieties of the Ruggles press, which was considered the best; the Lawyer and the first Gordons. The Franklin and Degener presses, which were operated between 1860 and 1870, did excellent work and could be depended upon. Their out-turn was nearly all upon dry paper, with a paper packing.

In the neighborhood of 1860 Andrew Campbell, a man of a highly inventive mind, brought out a new press. The three establishments now known as the Cottrell, the Potter and the Babcock had also a beginning before the war, the present heads of these houses then being together in one town in New England. From 1840 to 1855 the only maker of cylinder presses besides R. Hoe & Co. was A. B. Taylor, who before the earlier date had been the foreman of the machine-shop of the Hoe establishment. Taylor had a very small fraction of the trade. Since 1860 a large number of new houses have begun, each introducing some improvements or fancied improvements, and press-building has steadily increased both for number of presses and for quality. In general it may be said that American cylinder presses are firmer and stiffer than those of any other country, and the readiness which their makers have shown in adopting the suggestions of pressmen and publishers has enabled most excellent work to be turned out.

Conditions also were changing in the other departments of the printing-houses of the Union, and presses needed to be made so that they were adapted to their qualifications. As late as 1875 the Adams press was regarded as highly desirable to purchase by men about beginning business. It has since passed almost entirely out of use. A full description of it will be found under the head Adams Press. It was an adaptation of the theory of the hand-press to machinery. It needed much power to make the impression, as on the larger presses twelve to fifteen hundred square inches were exposed to pressure at once. On the cylinder press a line a quarter of an inch wide by forty or fifty inches long only was needed. Thus while the Adams could successfully print double-medium forms each addition in size required much more power and much heavier castings. Ten years after the war it was thought that the cylinder would do as good work as the Adams on everything except stereotype plates, then beginning to be superseded, and therefore there was no need of obtaining any new and very large Adams presses; but after this time the custom was introduced of saving presswork by imposing twelves as sixteens and twenty-fours as thirty-twos. The ordinary Adams press could not handle these, as it was not large enough; but the cylinder could. Thus this work was no longer held for it. Thirty years ago stereotype plates broke under the action of the cylinder press, and publishers were accordingly unwilling to have their books thus printed, desiring to have the work executed upon the Adams. To-day the plates are electrotypes, and the danger that they will thus break is infinitesimal.

One of the most marked features in the history of the press in America for the past thirty years has been the great variety of forms which it has assumed. It was previously remarked that nearly all presses in America between 1840 and 1855 were manufactured by two firms. This is not the case now. Over thirty are at present engaged in the work, some producing very little, but others manufacturing on a large scale. All early patents have expired, and the success of any machine of to-day depends rather upon its assemblage of old ideas and excellence of workmanship than any other qualities. There is little difference in theory between many of the makers. Distribution has been very much increased; the strength is much greater where the force of the impression comes; it is easier to get at the cylinder to make ready, and little accessories are attended to. Satisfactory presses are made by all of the larger makers and by nearly all of the smaller ones. Since the general introduction of dry printing and the great increase in the number of wood and process cuts more attention has been paid to perfect smoothness and regularity. The register is excellent.

English and American inventions in machine-presses may be tabulated as below, the English dates being taken from Southward, and a few added as to American inventions. In some cases the latter will be marked by a star, this corresponding nearly to the date of actual introduction when impossible to be stated with more definiteness. It does not generally include the inventions of the last twenty years:

Single Cylinder Machines.

Nicholson's projected machine	1790
König's first cylinder machine	1811
König's two-feeder	1814
Applegath & Cowper's Times four-feeder	1827
Hoe's single cylinder	1830
Sereno Newton, double Napier press	1833
Belper machine (jobbing)	1835
A. B. Taylor, cylinder press	*1840
Hoe, double cylinder	1842
J. G. Northrup, cylinder	1842
Middleton two-feeder	1845
Burdick's cylinder	1849
Main's machine (jobbing)	1850
Gordon cylinder	1852
Guernsey's cylinder	1852
Montague's cylinder	1852
Beaumont's cylinder	1853
Soulby's Ulverstonian (jobbing)	1853
Davis's oscillator	1855
Newbury's cylinder	1856
Babcock's oscillator	1856
Reynolds's oscillator	1858
Dawson's Wharfedale	1858
Ingle's machine (jobbing)	1858
Bremner's Belle Sauvage	1859
Campbell's cylinder	*1860
Potter's oscillator	1861
Degener's cylinder	1861
Kellogg's cylinder	1863
Harrild's improved Main	1867
Bremner's improved Belle Sauvage	1869
Parsons's Graphic two-feeder (cuts)	1874
Newsum's Anglo-American (cuts and hard packing)	1882

Perfecting Machines.

König's	1814
Cowper's	1816
Cowper & Applegath's	1818
Dryden's drop bar	1820
Napier gripper	1824
Anglo-French	1850
Dryden's Anglo-French	1860
Davis's	1880
Dawson's	1884
Payne's	1885
Newsum's	1886
Sauvée's (Marinoni)	1886

Platen Machines.

Large Size, for Bookwork.

König's experimental machine	1804
König's screw platen	1810
Treadwell's	*1822
Booth's	1828
Tuft's	*1826
Adams	1829
Napier's platen	1830

Small Job Machines.

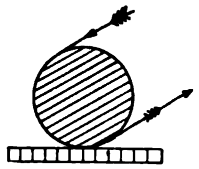
Ruggles	*1840
Yankee	*1847
Gordon	*1850
Gordon's Franklin	*1858
Cropper's Minerva (an English Gordon)	1860
Degener	*1861
Gally's	*1865
Bremner's platen	1870
Godfrey's gripper platen	1883
Powell's improved Gordon (English)	1885

Rotary Machines.

Nicholson's project	1790
Bacon & Donkin's prismatic machine	1818
Cowper's curved stereo-machine	1816
Badger's	1827
Rowland Hill's	1835
Napier's projected rotary	1837
Wilkinson's	*1842
Hoe's Lightning type-revolving	1847
Applegath's vertical cylinder	1848
Bullock web machine	1865
Walter press	1866
Marinoni single-sheet machine	1867
Victory web printing and folding	1870
Whitefriars rotary	1870
Foster's movable type web rotary	1871
Hoe's rotary web	1873
Marinoni rotary web	1876
Wharfedale rotary web	1882

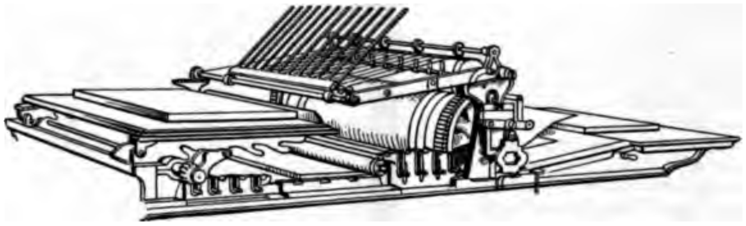
This list, it will readily be seen, is very imperfect, and does not come down to a late period. Most of our present makers are unrepresented.

The primary type of the cylinder press is that invented by König. A form passes under an impression-cylinder, and between the two is a sheet of paper which moves around the circumference of the drum. While the drum is a circle its parts are curves, and the smaller the part taken the less the deflection from a straight line. When a drum two or three feet in diameter is laid upon a plane surface all that touches is an eighth of an inch or so. Thus when the paper is passed between the circle and the bed it is in effect applying little plane surfaces in succession to each part of the form. All of the letters are touched and touched equally. If the plane surfaces all gave pressure at the same time all would be released at once. There would be a severe strain upon the machinery at the moment the maximum was reached, and there would be a secondary strain in relieving the platen; but by the circular method no more than the width of a lead-pencil is touched at the same time, and strength sufficient for this is strength for all. Neither is there a stopping of the motion at any time. It is continuous. Thus, as recent trials show, it is possible to print on a cylinder press at a rate full one-half faster than could be done on a platen press, while on larger sizes the disproportion would be still greater. It does not seem practicable on a platen press to pass beyond a certain area, somewhat less than a couple of thousand square inches. There is no reason why on a cylinder press three thousand square inches could not be printed, and on the web presses five or six thousand. The component parts of a press are the cylinder, the bed, the lower framework, the foundation, the mechanism which moves the bed, the feed-board, the fly, the fountain, the ink table, the rollers and the grippers. There are some little parts besides.

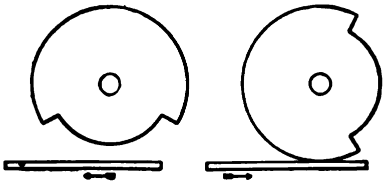


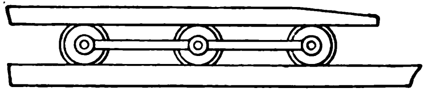
THEORY OF THE CYLINDER.

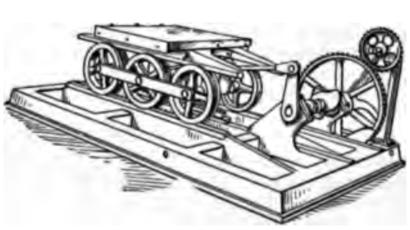
The most common printing-machine in this country is the single cylinder. The sheet is fed so that the impression is made between it and the form lying flat upon the bed, and passes still farther on until it is caught and taken away. The paper must be held to the revolving portion up to the moment that the impression is complete and then withdrawn; the type must be inked by rollers, and the cylinder can remain in contact with the form for the fraction of an inch only. The form must also be able to return to the place from which it started without interference from the cylinder. However the revolving portion moves, whether steadily or intermittently, its motion is exactly the opposite of the return movement of the bed, and the latter will not be able to get by. König solved the problem in one way by cutting away portions of the cylinder, and Napier solved it in another way by raising the cylinder at the proper time long enough to allow the bed to pass under. The rotary machine does not experience this difficulty, as all movement is forward.


UPPER PART OF A CYLINDER PRESS.

It is evident with so great a force applied against the bed, an equal force against the axles of the cylinder, and the necessity for a movement of the bed and rollers, that the framework of a press must be very strong. In fact these foundations are usually very massive and in as few pieces as possible. When put together by bolts, nuts and screws everything must be perfectly solid, for the bed with its load comes into continual concussion with the ends, and the centre is also strained where the impression force is applied. The bed and its supports are strained down and the cylinder and its axles are forced up. It is therefore necessary to make ample provision for all of this. The bed is always shorter than the framework. On some presses it projects at the end of each movement or of one of the two movements, but this is where much of the other end has no part of the bed over it. It is uncovered. The bed is either upon sliding-ways or upon rollers, over which it slips. These are well oiled. It is very firmly held so that it cannot move laterally, and the rollers and slideways are carefully adjusted so that the bed shall be exactly level. The whole, however, may be upon what is known as the railway-truck. The bed is usually in two parts, one being the ink table and the other the place of deposit of the form. The latter is only a little larger than the largest sheet of paper which can be worked.

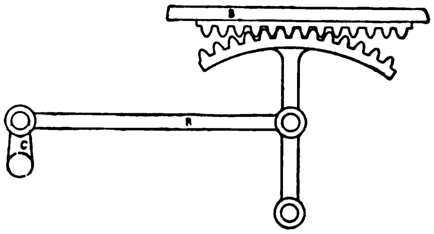

THE CUT-AWAY CYLINDER.


RAILWAY TRUCK.

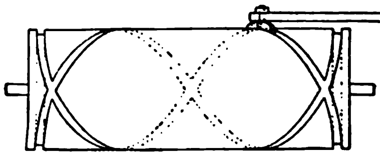

GERMAN RAILWAY TRUCK.

When the bed is sustained upon tracks the part which projects and touches the truck is polished finely and is made very even and level. In the tracks there may be and probably are friction-rollers, which are as close together as is convenient. Often, however, the bed is sustained by something resembling a railway-truck. The wheels move on a rail or in a groove which confines them so that there shall be no lateral motion. Every effort is made to insure evenness of pressure, so that each wheel shall bear its own load. In another form of this the bed is supported by two trucks of six wheels each. Each wheel, of course, should bear one-twelfth of the whole weight. The bed has a liability to sag, no matter how thick it may be, if supported only at the ends; but by having a multitude of wheels the weight is distributed over the whole of them.

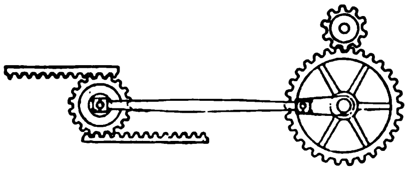
The bed moves back and forth from two to five feet, according to its size, its propulsion being accomplished in several different ways. By the sector movement a crank pushes forward a lever, upon the top of which is a geared segment of a cylinder. The gearing fits into similar teeth above, and the bed is thus moved back and forth. B represents the bed, R the crank, and C the place where the connection is made with the driving-wheel. The nearer to the pivot of the sector the crank is fitted the greater the speed of movement. Another method is that adopted on some English presses. A revolving cylinder is so placed that it runs from one end of the press to the other. In it are grooves about an inch in depth, being really a screw with female threads running from end to end; a pin fits into one of these grooves, along which it moves as the drum turns. When the pin reaches one end it follows the groove, which has passed around the circumference, and the bed is stopped for the length of time it takes until the pin falls into the other groove, when it begins its backward motion. It is not stopped or caught fast when the one groove crosses the other, for the bed is in motion and pushes the pin across the opening. In the Napier platen press there is a groove in a huge wheel set diagonally under the bed, with which is connected a pin, as in the preceding machine. At the



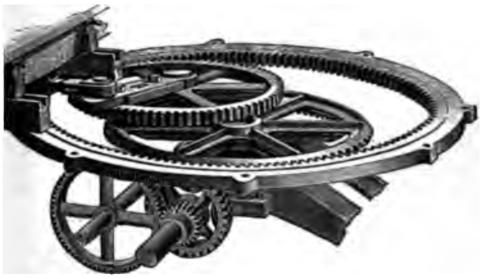
SECTOR MOVEMENT.


REVOLVING DRUM MOVEMENT.

nt of impression the bed and pin are lifted from t with the beveled drum, falling again as soon as nds. The commonest movement is perhaps that geared crank movement. In order to do work y the bed must move backward and forward with rapidity. In an hour there are only thirty-six hun- econds, and for a speed of a thousand to be attained time only a little over a second and a half can be d each way; for fifteen hundred only a second, r two thousand only three-quarters of a second. this must be subtracted the amount necessary for al and for slacking up. The bed is heavy and re- much power to move it, and its reversal racks and


GEARED CRANK MOVEMENT.

e whole machine unless speed is lessened before d is reached. The slackening must be done by the power itself. In the geared crank movement m is either farther advanced or nearer than at any time when the end of the bed is reached, and con- tly slows up itself. In the movement given here- used, among other manufacturers, by Potter and he crank comes to a complete rest when the bed he end, the stoppage and beginning again being eptible. Another plan is where the geared wheel wn instead of being on its edge. A very ingen- nd complicated movement is employed upon the s of König & Bauer, of Germany. It consists of bination of three geared wheels lying upon their By their use the speed is checked in the easiest ost noiseless way, the gearing passing around the

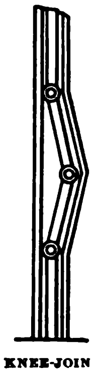

SUN-DIAL SYSTEM OF KÖNIG & BAUER.

side of the circumference of a great geared wheel. movement of the mechanism generally is going on ck and forth motion is stopped for a brief time.

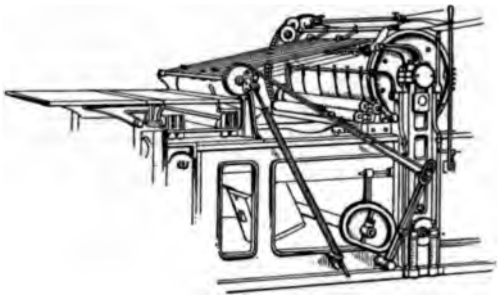
ddition to the contrivances for slowing up and the reversal caused by the motive power buffers, s and air springs are also largely employed. It edient to help the mechanism. Powerful coiled s have been more used than anything else, but essed air is also well known and is very useful. It no resistance when the impact begins, as it is then state of diffusion in which it is found in nature, creases its opposition very rapidly until the piston rdly be driven into the last half inch of a cham- Both wire springs and air springs diminish the noise concussion very much.

ve the lower foundations of the press rise other destined to hold the cylinder. This is determined uch by the form and shape of the drum, whether rge or small. This cylinder need not be more than or four inches greater in circumference than the narrow way of the form placed upon the bed, or it may be three or four times as much. The upright posts at each side differ also in respect to strength. If the cylinder rises and falls more mechanism is required than when it has no other motion than turning on its axle. König's first cylinder press had a part of the impressing surface cut away in three places. Thus three sheets were in process of printing at one time, the motion of the cylinder being intermittent. It is never cut away at present in more than one place, and the cylinder, of course, must be weighted on that side to keep the equilibrium. The theory of the cylinder is exactly that of the mathematician concerning the circle; it is composed of an infinite number of sides. The circumference of a drum ranges from forty inches to over a hundred, and each of these inches is deflected very little from a straight line. At the acme of pressure it seems to be altogether straight. But in order to do good work the cylinder must be truly circular and the bed must meet it squarely. The one cannot yield to the other and meet it half way, because both are held rigidly in their places. The only change in position which the cylinder can make is to be raised the fraction of an inch to permit the form to return under it; but it can be slackened in speed. If geared throughout with the bed, the circumference of the geared wheel being exactly equal in length to that of the gearing which is upon the bed, the rotation of the cylinder becomes slower when the bed moves slowly, is more rapid when the bed gains more speed, and in all respects conforms to it. But in many cases the cylinder is only in gear with the bed at the moment the impression is taken, the bed and cylinder both moving at a uniform rate from the beginning to the end of this operation. When completed the gearing is disconnected, the bed slowing up, but the cylinder still moving as before. It is usual in the former case to have additional connections between the bed and the cylinder so that no slipping can occur.

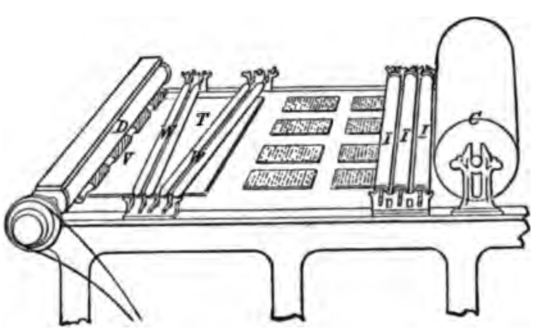
The cylinder is hollow, and usually answers a double purpose. Part of it is the impressing surface and part is the receptacle of the grippers or metallic fingers which catch the sheet when it is fed down to the mark. An open space is here left in the drum. When the revolution is complete the fingers open, seize the sheet in closing and carry it to where the point of delivery is reached, when they again open. In most cases this is accomplished by tripping. The cylinder is carefully ground to a true circle and is of great strength, but ought to be as light as possible, consistent with stiffness and durability. In presses which do not have rising and falling cylinders a considerable portion of the surface of the drum is cut away. In those which do rise and fall no part is cut out. When rising is necessary the axle upon both sides is elevated by a wedge, screw or knee-joint action, which is withdrawn when the impression is to be taken, and the whole is securely clamped until this is complete. Then the clamping is removed and the cylinder is again raised. The axle of the cylinder as well as its surface must be exactly parallel to the bed, and both must be truly horizontal.


KNEE-JOINT CYLINDER RAISER.

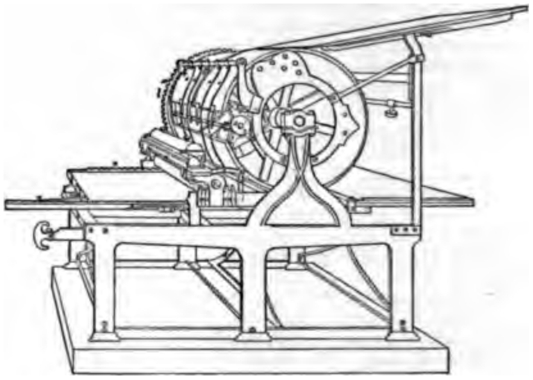
The sheets are first placed upon the feed-board, which inclines somewhat towards the cylinder, but only sufficient to facilitate the movement of the paper downward. On some English presses the inclination is much steeper than is thought by American press-builders to be desirable. At the lower end there is a gauge against which the sheet is laid, as well as a gauge upon one or the other side. The sheet is laid against these gauges, and when the proper time arrives it is seized by the grippers, which hold the beginning of the sheet firmly, and the circular motion keeps the remainder of the paper pretty close to the drum. To prevent the sheet from falling tapes, rods and wires are also used, the two latter being bent to the form of the cylinder. Thus, while they are not exactly against it, they are near enough to prevent the paper from falling. On the other side there are similar contrivances. Usually tapes alone are employed here, or the delivery depends only upon gravity, the sheet falling upon the fly; but the regular and equal movement is much facilitated by tapes, which run in the same direction as the fingers of the fly. These are depressed until the sheet is in its right place, when they begin their upward motion. Sometimes as the cylinder-grippers are relaxing another pair of grippers seizes the paper and carries it away. If done quickly the sheet will float almost horizontally through the air. The fly is an important adjunct to the press. It has fingers like a rake, but much longer. It lies with the ends close up against the cylinder when the sheet is delivered; but as soon as that movement is complete it turns part of a circle on its axle and delivers the sheet of paper upon the top of those previously printed. The earliest flies did this with a resounding slap, but those now employed can be made to descend as lightly as desired. Until within a few years it was necessary on any good work to take off the printed paper very often, each time evening up its edges; but by contrivances now known as joggers each sheet is moved to its proper place at once. By different methods on different presses sheets can be delivered white side up or printed side up, or can be delivered at the front of the press.

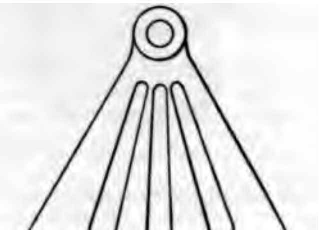

MECHANISM OF THE FLY.

The inking apparatus on a cylinder press is usually fivefold. It consists of a fountain, or receptacle for ink; a fountain-roller, or roller which first receives the ink; an ink table, or place where the distribution can take place; distributing-rollers, which turn over the particles of ink and keep them in continual motion; and form-rollers, which actually apply the ink to the form. All are necessary on good work. The fountain is really a long trough or box filled or partly filled with ink. At the side where it is intended to discharge this ink there are round holes, slits or a crevice extending the whole distance. Against these interstices is a gate or knife-blade which can be moved up when ink is desired to flow more freely, or further closed when too much ink is given out. The ink is viscid and moves very slowly, and unless the opening is large very little will pass out in an hour. Against this the fountain-roller rocks or moves at certain intervals, each time taking a little away. It falls upon the ink table, which in most presses is a prolongation of the bed upon which the form lies, but nine-tenths of an inch higher. Here the ink is stripped off, and the distributing-rollers then keep it in constant motion over the surface. They are usually set at an angle, so that the same part of the bed shall not be touched twice by the same part of the roller. Sometimes preliminary rollers do the first part of the distribution, the cylinder against which they revolve being of metal. The part of the ink table nearest the cylinder, which is covered with distributed ink, as it passes towards the cylinder goes under the form-rollers and imparts to them their color, of course with additional distribution, and they in turn roll the form on its backward motion. Four form-rollers are usually thought sufficient for the last, but there may be more than a dozen or fourteen altogether. Each of the composition-rollers is usually held down in place by metal rollers of a much smaller size, and there are usually contrivances by which there is a slight vibratory motion to all of the rollers. It is in respect to distribution that the present presses are most in advance of those of thirty or forty years ago. On some presses distribution can go on while impression ceases, the cylinder being tripped or raised. In the cut showing distribution D and V are parts of the fountain, T the ink table, W the distributing rollers, I the form rollers and C the cylinder.



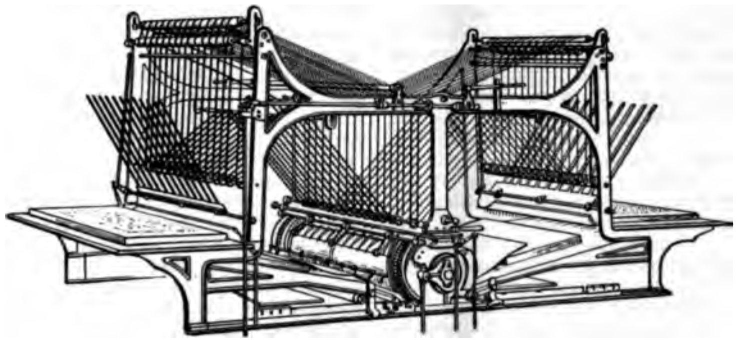
FOUNTAIN, INK TABLE AND DISTRIBUTING ROLLERS.


NAPIER PRESS (LARGE CYLINDER).


EARLY ROCKING-PRESS.

The cylinder machine has several forms. It had formerly nearly always a large cylinder, the early pressmen thinking better work could be done thereby; but the present preference is for a small cylinder. A stop-cylinder is where the impression having been taken the cylinder stops until the next impression is ready to be made; a two-revolution press is where there are two revolutions to the cylinder to each complete impression, one rotation being executed while the form and paper are beneath, and the other rotation while the form is returning. A three-revolution press is similar to the above, but two of the rotations are executed when the impression is not going on. Some presses are so made that

the form goes back the cylinder goes back with it,
completing a revolution. In this case two-thirds
cylinder is superfluous, and some manufacturers
cut it away, as in the Davis and Potter press in
This press was seen by the writer at about that
ınd did good work. Another form of the cylinder
is the two-cylinder. It is evident that as a form
equires a space of about three feet longitudinally
arge daily paper, and the cylinder above it requires
ıre, a lengthening of the bed of the press three feet
l enable another cylinder to be fitted there and give
er feeder standing room. While the form was pass-
reach the farthest cylinder it could print a sheet
first, thus doubling the performance of the press
same time. Of course, the expense of making the
would be largely increased, but the question of
is sometimes of vast importance. This principle
be applied even to three, four or five cylinders, or
t to any number of them, the only question being
ıow long the press should be. Practically this plan
ever been used for more than two cylinders, and
y also the impression is not given to both on the
rd movement, but to one on the forward move-
and one on the return, the feeders thus being on
ite sides of the press. The cylinders lift in turn.
orm of the double-cylinder machine has been the
ting-press.
one of these
s when the
paper is fed
sses around
ylinder, and
d of drop-
or being car-
ıway is still
held and
through un-
e second cyl-
when the re-
on is printed.
practical ob-
n to this has
great on ac-
of the ink
ling over the
e. It is very
d economy both in labor and in speed, but the in-
ccasioned by the transfer of the ink has been and is
lifficult to overcome. Ink being a fluid, although
depends upon the action of time to render it dry
lid; but the impressing surface of the second cyl-
cannot fail to take some of the ink which is upon
rinted side, and this rubs off on the next sheet.
contrivances have been employed to counteract
efect, nearly all, however, depending upon the in-
ition of some substance which shall first take off all
superfluous ink. Whatever this is it must itself
ved away or cleaned, or it, too, will blacken the
e against which it is used. The most effective
seem to be to have the paper which has been print-
on one side pass against a roll or belt of clean paper
is continually moving its position. It takes only
rplus and speedily dries. When its turn comes to
e more ink its former charge has become dry or
so. Another plan is that used by Firm in this
ry and Alauzet in France. The paper passes
t a composition roller, which takes the excess of
hat rotates against a steel roller, which is wiped
ually.
l another style is the double feeder or four-feeder.
ed is flat, but the cylinder prints two sheets in a
lete rotation. Double feeders were once largely
n newspapers, but have now been superseded by
r and better presses. The example here given is
ell-known English press, the two-feeder Bremner
ne.


DOUBLE FEEDER.

The style of press known as the platen is sufficiently described under the head of ADAMS PRESS. This is the only form of a platen press which has been in use in America for fifty years. The job presses are also platen presses, but of a smaller and lighter make. It has not been found desirable to make cylinder presses smaller than medium in size, and below this the job presses have monopolized nearly all of the work for many years. There are two other kinds still, the TYPE-REVOLVING PRESS and the WEB PRESS, which will be described under those heads. The former was once very extensively employed by newspapers; but it has now gone out of use, except for some special work; the latter is of great value, is much employed, and is likely to be still more so in the future. Improvements are constantly being made.

2. The word written at the head of the first page of each signature when all of the proofs have been read and the matter is ready to be printed. The previous revise should be carefully looked at, the folios and head-lines examined and the ends of lines noticed, even if the proof has not been read again. Stower remarks on this, and his words are so true that they have been copied by most writers on typography since: "A proof-sheet having duly undergone this routine of purgation may be supposed to be as free from errata as the nature of the thing will admit, and the word 'Press' may be written at the top of the first page of it. This is an important word to every reader. If he have suffered his attention to be drawn aside from the nature of his proper business and errors should be discovered when it is too late to have them corrected, this word 'Press' is as the signature of his death-warrant of his reputation; and if he is desirous of obtaining excellence in his profession will occasion an uneasiness of mind which will but ill qualify him for reading other proof-sheets with more care and correctness. A reader, therefore, should be a man of one business, always upon the alert, all eye and all attention. Possessing a becoming reliance on his own powers, he should never be too confident of success. Imperfection clings to him on every side; errors and mistakes assail him from every quarter. His business is of a nature that may render him obnoxious to blame, but can hardly be said to bring him any very large stock of praise. If errors escape him he is justly to be censured, for perfection is his duty. If his labors are wholly free from mistake, which is, alas! a very rare case, he has done no more than he ought, and consequently can merit only a comparative degree of commendation, in that he has had the good fortune to be more successful in his labors after perfection than some of his brethren in the same employment."

3. Press is also much used to denote the productions of a printing-office. In this sense the newspapers to-day are deemed by themselves to be the press. PRESS, LIBERTY OF THE, is treated under that head.

Press Blankets.—Blankets used as tympans. They are sometimes laid in between the two tympans when made of other material.

Press Clubs.—Associations which have become very common in the United States. They owe their beginning to the necessity which is felt by newspaper-writers of having some place where their work can be carried on while their own offices are inaccessible, or where they can work at leisure. In New York there are the Press Club, the German Press Club and the Women's Press Club. The first two of these are open twenty hours out of the twenty-four.

Press-Girthing.—The webbing which checks the running in or out of the press-carriage.

Press Goes.—When the pressmen are at work.—*Stower.*

Press, Liberty of the.—The liberty of every citizen to print what he chooses. This will not prevent him from being held to account afterwards in the courts for anything which may be considered against public morality or which may be libellous. In the early ages of civilization there was, of course, no printing, and individuals who wished to hold up others to contempt or to criticise matters in which others were concerned were compelled to do so verbally or by pictures or writing. This they did at much risk if the persons thus attacked had power; but none of these things could be done except in person. There was no post-office by which invectives or criticism could be sent to another town, there to have an effect; but when printing was invented the power of one who criticised another or stated facts which might be disagreeable to some other person was wonderfully increased. Only a few people could hear his voice, and probably not half a dozen would read a letter, while the printed sheet circulated everywhere, going to distant towns as well as to places close by, and being preserved for centuries. Hence those in authority at once attempted to suppress comments upon themselves and upon public affairs generally, and did so to a great extent. As population and wealth grew greater, however, and presses multiplied, it became impossible to continue the policy of repression, and the rigorous rules once existing have been greatly relaxed everywhere. The theory by which complete subjection of the press was maintained was that as it was so mighty for evil it ought to be held strictly to accountability in order that nothing injurious to morals, to religion or to magistrates and people in authority should be published. Adverse criticism of the acts of the government had a tendency to overthrow it, and was thus in the highest sense an injury to the community. Almost every conceivable opinion may thus be rendered libellous or injurious. It seems to be the general idea of those who are in power that opposition to them must be factious, and this belief extends to republics as well as to monarchies. The right of printing rests upon the same grounds as the right of speech, the art only giving circulation and permanence to what was before spoken. Newspapers take up and state what has previously been thought and uttered by men. There would be no value in representative governments if this liberty of reporting and criticising could not be exercised, for we may conceive of a legislature consisting of comparatively few members being bought up, which would be impossible with a press. The power of the slaveholding oligarchy in the Southern States before the Civil War did not prevent criticism of their acts, nor did the laws in France under Charles X. prevent that analysis and denunciation of his government by the press there which resulted in his downfall. In the United States the overthrow of what was known as the "Tweed ring" is a recent instance. Many attacks have been made insidiously upon the liberty of the press in all countries. That which should be opposed by all who desire to see it remain free is: 1. A license system. 2. An examination of the mails, or an attempt by post-office officials to determine what shall or shall not be carried. 3. A compulsory imprint. 4. A sum of money as caution money. 5. A tax on advertisements, on circulation or on paper. 6. A sworn statement as to responsible editor or publisher. 7. A strict libel law, in which the truth is not to be given in evidence, as proving the statement or in mitigation of damages. 8. The holding of appointive offices by editors or publishers.

Press Lock-Up Chases.—Large chases specially made to allow of small jobs being locked up inside them on the press.

Press-Pin.—A bar of iron used as a lever for standing-presses; a smaller kind for lying-presses.

Press-Plates.—The iron plates placed at intervals in the hydraulic press.

Press-Proof.—The final proof passed by the author or publisher for press. It is also the last proof of the proof-reader. See, for some remarks under this head by Stower, the article PRESS, subdivision 2. Again, a press-proof is a final proof made of an electrotype or stereotype plate.

Press-Revise.—A sheet from a form upon the press to see if all corrections marked in the press-proof have been made.

Press-Reviser.—The reader who has the charge of revising the final proofs.

Press-Rollers.—The rollers used upon a hand-press in England; as distinguished from machine-rollers.

Pressroom.—The room where presswork is done. In most establishments it is one of the lower floors, as there the vibration is least, and there the difficulty of erection is at its minimum. Presses require a long time to set up. It has been found in recent removals of printing-offices in New York that it was impossible to get workmen to take down a dozen presses in one place and erect them in another under a time of less than three days to a press, while in many cases a week on an average was required. Large presses should be near a main shaft, while those at a distance from one should be the lightest and smallest. It is of great importance that the pressroom should be warm. The pressman may not require it, but rollers will not do good service below a certain temperature. Thus, if there are windows all around and there is reason to believe there will be cold weather in winter, extra steam-pipes or stoves will be required. Hot-air pipes, discharging under the press or at its end, would serve effectually. On the other hand the room must not be too hot. In the summer time rollers may melt.

In very large establishments book and news paper is generally stored in a room apart, while cards, envelopes and flat paper are kept in the office, but in moderate-sized offices book and news must generally be placed in some corner of the pressroom. This should be in a dry place. At present few offices have facilities for wetting down paper unless a daily journal is printed. There are special contrivances for wetting down rolls of paper for a web press, which will be spoken of under that head, but if a daily paper with a moderate edition, printed on a flat bed, is to be wet a vat and tables are necessary. A space of fifty square feet is sufficient, or even on emergency much less. Good troughs should be provided for washing forms. Receptacles should also be at hand for rollers which should insure them from being gnawed by rats and mice and keep them at an even temperature. It is scarcely necessary to make any provision for casting rollers, as nearly all offices of any size now buy theirs ready made. Many make an agreement with the roller-maker by which he shall furnish them with all of the rollers needed for a year at a set price per month. In this case when a roller cracks, gets hard or gets old it is sent to the roller-maker, who replaces it. A freight elevator or lift is very desirable to the pressroom if it is in the basement below the street or on one of the upper stories. Paper is very heavy, and there are many other heavy articles around a printing-office which render it desirable to have an elevator. Even if the pressroom is on the main floor there is much work for the elevator. Trucks or low, heavy wagons to be drawn by hand are very useful for the transportation of work. They should have rubber tires to the wheels. Presses are arranged as near to the windows as possible, consistent with facilities in handling the paper and going around the machines. The ends are usually against the windows, their length being across the room. Sufficient alleyways must be allowed for the paper, both when received and when taken away. Inks should be carefully put away when no longer required, the covers to the tubs, barrels or kegs being closed over to prevent the admission of dust. When opened again the skin which forms on the surface should be thrown away, as it cannot be incorporated with the rest of the ink, forming strings and chunks. Here also should be the varnishes, coarser bronzes and dusting colors. Expensive inks and bronzes should be locked up in a closet, and it will do no harm to lock up the ordinary inks if it can be done. A well-organized pressroom has one or more paper-cutters, very likely a folding-machine, and possibly a mailing-machine. These, except the paper-cutters, are really no part of the pressroom, but need to be cared for just as much as if they were. The foreman of the room usually has charge of the whole of them. Large and substantial paper-cutters are of more value than those which can just do the work.

The foreman of a pressroom is responsible for all of its work. Unless under other directions, he receives and receipts for paper, examines the packages to see whether the quantity and quality ordered is there, and in like manner receives and takes care of all inks, cards and other materials. When a job is done, or when enough is finished to justify a delivery, he notifies the office or bindery and turns over the product to them. If directed to do up the packages and send them away he does so, although this is most commonly attended to by the warehouse department. He has a book in which are recorded the quantities of paper and other articles received, and the amount used on each job or order is also shown. The latter subtracted from the former will show the amount on hand. He keeps an account with each press, showing the number of impressions taken each day and on whose account. This in the first place is a general book of performance, as follows:

PRESSROOM SCHEDULE FOR JUNE 1, 1893.

WORK.	No. of Impressions.	Rate per Token.	Total Earned.	Press.	Ink.	Began.	Ended.
Gibbons's Rome	9,000	$0.45	$16.20	Campbell No. 1.	$0.40	7:30	6:00
Bryant's Poems	4,000	.60	9.60	Campbell No. 2.	.75	9:00	6:00
Auction Bill No. 273	250	....	2.00	Campbell No. 3.	.30	2:00	3:00
Ridpath's United States	7,000	.40	11.20	Potter.	.40	7:30	4:00
Jones & Smith's Catalogue	6,000	.35	8.40	Cottrell No. 1.	.40	10:00	6:00
Law Case No. 1,181	50	....	1.00	Cottrell No. 2	.40	1:00	2:00
Life for Life	12,000	.35	16.80	Hoe.	.40	7:30	6:00
Hood's Poems	8,000	.60	19.20	Huber.	.75	7:30	6:00

This schedule should be on a large sheet of ruled paper with enough lines and subdivisions upon it to tell all of the details of the matter. At the centre of this sheet, up and down, should be a blank, so that the sheet can be set in a book and stitched there. On the left is this table, while on the right are blanks for other details, as, for example, the name of the pressman and feeder, the length of time stopped from accident or from failure to obtain paper or suitable ink, the stoppage through alterations and their amount, the amount to be charged against overlay, and the nature of any accident or other circumstance which will account for greater or less performances. This is completed early in the morning and sent to the counting-house, where it is examined by the manager. If he indicates any alteration he does so in red ink; the schedule is then copied by the bookkeeper into his book of accounts with the press, and the original sheet is sent back to the foreman, who inserts it in his book. From this either the foreman or the manager can tell how much work Campbell No. 2 did in three months, and whether in the time it was employed its performance was as good as the Cottrell No. 1. From it he can tell the average cost of his presswork as compared with its theoretical cost; the labor executed by each pressman and feeder; the number of times each press broke down, and in fact all details. They can be summarized in many different ways. In the example here given the price as set down is the employer's price to his customer, but if reduced one-third and considered as the cost it will equally answer the purpose. Each week or month the expenses thus found should be added together in the counting-room, with the charges for superintendence, heat, power, insurance and all other miscellaneous expenses and compared with charges for the work. If the latter are less than the former this portion of the office is running at a loss; if on an equality it is also losing, for all of the money charged is not collected. There must be a considerable surplus in order to make any profit. The foreman enters the orders which he receives as they come in and notes when they are finished. He receives these orders usually upon his tickets, and then he indorses them when they leave; but he must also enter the headings and time in a book, and he must keep a wages-book.

An allowance ought always to be made by a pressman for waste. This on small orders should not be less than 5 per cent., and on larger orders from 1½ to 2½ per cent. In the estimates on ink where there is a separate charge a certain quantity must be left for waste, as it is impossible to tell exactly how much will be used. On high-priced ink this is frequently very important, as a pound or nearly that will be left on the rollers and in the fountain. Estimates on ink are comparatively trustworthy when common bookwork or newspaper work is considered, but illustrated newspapers and some other work sometimes quadruple the other amount. A pound a token is not unusual on some of these orders. Colored inks with a metallic basis are far heavier than those with a vegetable pigment for a foundation. Nothing surpasses black ink in extending power. It is formed from soot, and the blacker the ink is the less it weighs per pound.

Estimates on presswork are regulated by the size, value and speed of the press; the wages paid to pressmen and feeders; the quantity of the paper and the time given to its preparation; the value of the ink or bronze used; time given to overlays and making ready; size and nature of the form and the haste required. A committee of the New York Typothetæ lately made a report on the question as to what prices should be charged. It believes that a small eighth-medium press should earn about $5 a day, while quarter and half medium presses should earn $6; but if operated by experienced pressmen instead of boys from $7.50 to $9 are required. Flat-cap, medium and super-royal drum cylinders with boy feeders should earn $10 a day. Stop-cylinders of this size with extra pressmen should earn $12 a day. So should ordinary double-medium (24 by 38) and double super-royal (29 by 43), either drum or two-revolution machines, costing from $3,000 to $4,000. Stop-cylinders of these sizes on fine work ought to earn $15 a day. Double imperial (33 by 46) and all machines up to the size 36 by 54 should earn $15 a day, but stop-cylinders $18 a day. The largest machines (40 by 60 inches and larger) should earn not less than $18 a day. When extra fine work is to be done on a small press, and this press has to be managed by a workman at higher wages than is usual for a press of this class, the rate per day should be proportionately increased. Papers which are extra thin and hard to feed, which are overcharged with electricity when delivered to the pressroom, which are of flimsy fabric and difficult to handle, should be at an extra rate. Coated or surfaced papers ought also to be higher. Cutting of overlays in advance is worth seventy-five cents an hour. For very small type an extra charge should be made.

In the selection of presses for a new office it is generally best to have them all of one kind or from one maker. Thus the men get thoroughly accustomed to one press and know what can be done with it. When there are many kinds accidents may happen on one which the pressman there employed will not exactly know how to rectify.

One of the great difficulties of the present day in this department is electricity. The paper after it reaches the fly shows an unwillingness to leave it, or when it does will not fall squarely and evenly in its place, but rubs over the surface, thus smutting two sheets. Nothing certain is yet known as to its management. Three plans have been tried. One is to have wires extend through and under the press, drawing off the electricity as soon as it is generated; another is to have the air near the fly dry and hot, and the third is to have the whole pressroom moist, somewhat like a laundry. Both of the latter plans have operated well under some circumstances, and the former method has occasionally effected a relief; but the true remedy seems to be to get the paper from the mill in a non-electrical condition. Then no difficulties arise. It is understood that many of the paper-makers are willing to make such contracts.

Press-Stone.—The stone formerly used to make the bed of a wooden hand-press. It was of marble or purbeck, and was slightly smaller than the coffin to admit of being bedded in. This was done with sawdust or paper, and enough was put in to raise it a little higher than the surface of the coffin. Its width would have been in an ordinary press eighteen inches, and its length two feet. This, it must be recollected, was the largest form which could then be printed, the size being about medium. Two pulls had to be taken, the platen being only 13 by 19 inches.

Presse (Fr.).—Press.

Presse à Bras (Fr.).—Hand-press.

Presse à Dorer (Fr.).—A gold stamping or embossing press.

Presse à Pédale (Fr.).—A press worked by foot-power.

Presse à Timbre (Fr.).—Stamping-press.

Presse à Tranchefiler (Fr.).—An edge-gilding press.

Pressier (Fr.).—A pressman.

Pressing-Blocks.—Blocks of wood used for filling up a standing-press when there are not enough books.

Pressing-Boards.—The glazed boards which are used for pressing printed sheets.

Pressman.—One who labors at a press; the workman who is in charge of a press. In England this term is applied chiefly to a hand-press man, the workman on a power-press being called a machine-minder, but there the word is also applied to those who work on newspapers as writers. In this sense it is never so employed in America.

Pressmeister (Ger.).—The pressman.

Presswork.—The work executed upon a press. It consists in keeping the press clean and in order; in putting on and taking off forms; in supplying the machine with rollers and keeping them in good condition; in having the proper ink and in putting the machine in motion, supplying it with paper and taking away the printed result. Presswork also implies having the forms properly made ready, with their proper underlays and overlays, and in fact every species of labor which relates to the press, including washing the forms. The erection or removal of a machine-press is not properly speaking a part of presswork, although fifty years ago when cylinder presses were uncommon it might have been deemed a part of the duty of the pressman when needed. At the present day the press is erected by a machinist, who tries it and sees whether it will work properly. When he finishes the work of the pressman begins. There are two kinds of work done upon presses—one of posters, common newspapers and other things in which little attention is paid to nicety, and the other where it is of importance to get good results. The former is usually printed with soft packing, a rubber or blanket stretched against the cylinder, and the latter with hard packing, when between the metal of the cylinder there are only mill-board and paper. Different methods are required to get good results out of either of these, and a knowledge of how they may be obtained is a necessary part of a pressman's education. Upon either of these packings there may be a necessity of applying more pressure at some particular part, and the workman should know how to do this. The form must be made even, so that the surface shall be exactly level, which is done by underlaying. He must also see that the rollers are in proper condition and in their proper places, the supply of ink sufficient and everything in order. For the presswork the pressman in charge is responsible. He may not have made the overlays, but if he finds anything wrong about them he must call the attention of the foreman to what he has discovered; if he himself has prepared the overlays he should rectify any fault afterwards noted. A pressman in New York, Philadelphia, Boston and Chicago usually has charge of two presses. In some towns he takes charge of three, but this is generally regarded as bad policy. Each of the presses has a boy or young man as feeder, whose duty it is not only to stroke in the sheets but to do all other work he is told to perform. In this respect he is exactly like a laborer; his occupation is not a trade. The pressman, on the contrary, cannot be expected to do any other work than presswork or that which facilitates it. He cannot, for instance, be expected to take care of a steam-engine, except by special agreement, nor to deliver work. The feeder, if a boy or man, lifts up his own paper upon the feed-board; if a girl this labor is performed for her. Whatever may be required in lifting, cleaning, handling or moving that is within the feeder's strength should be performed by him. Much of the time of the pressman is taken up in seeing whether his work looks properly, whether the sheets have too much or too little color, whether the rollers are working as they should, and whether any improvement is possible. Should he discover anything wrong, as, for instance, that some of his paper is not cut squarely, he should report the matter to the foreman. It is the duty of the foreman as often as possible to see that the work is up to the standard which has been given, and for this purpose he should continually be inspecting the performance of the presses. Details respecting many of the points of presswork will be found under the names of the presses, as well as under Making Ready, Overlaying, Rollers and Underlaying. See also Press and Pressroom.

Prestonian Machine.—An English rotary machine adapted for newspaper work and equally available for type or stereotype plates.

Prices.—The old prices of articles used by printers are given in Stower's Printers' Grammar, issued in 1808. A frame was worth £1 4s.; cases, 14s. per pair; great primer and above, 2s. 2d. per pound; English and pica, 2s. 4d.; long primer, 2s. 8d.; brevier, 4s.; nonpareil, 7s.; diamond, 13s.; two-line bourgeois and above, plain, 3s.; two-line nonpareil, 4s. 6d.; two-line brevier and above, open, 5s.; two-line nonpareil, open, 7s.; script, 4s.; music, 8s.; orientals and flowers, double the price of the body; wood type, six to eight line, 3d. each letter; ten-line, 4d.; fourteen-line, 6d.; twenty-line, 9d.; thirty-line, 1s.; and forty-line, 1s. 4d. Four-to-pica leads were 1s. 10d. per pound; six-to-pica, 3s.; eight-to-pica, 4s.; and fourteen-to-pica, 10s. Octavo galleys were 1s.; quarto galleys, 1s. 6d.; composing-sticks, 8s. 6d.; double pica reglet per dozen, 3s.; English reglet, 2s. 3d.; and nonpareil the same. Side and foot sticks were from 1s. 6d. to 2s. per dozen; quoins, 16s. per thousand; royal chases, £1 14s. per pair; demy, £1 11s. 6d.: royal letter-board, 6s.; common size printing-press (wood), £31; foolscap, £21; Stanhope press by Walker, £73 10s.; by Shield, £63; printing-ink, six prices, all for black, no colored being included, beginning at 1s. 4d. per pound and rising to 10s. 6d.; book-press and bar, £5 5s., and with iron screw, £18 18s.

Prima.—The first word of a sheet. The ending of one signature and the beginning of the next is always
G, p. 97,
shown on the copy by a mark which indicates both this fact and the number of the page as above. The next signature will be G and the page will be 97.

Prima Prove (Ital.).—First proof.

Prime (Fr. and Ger.).—The prima.

Primeblatt (Ger.).—The first sheet of a book.

Primentafel (Ger.).—The list of signatures.

Prince of Wales Note-Paper.—A size of writing-paper used in England, 4½ by 3 inches.

Princeton Press.—A press made in Princeton, N. J., by John T. Robinson before the Civil War. The bed was stationary, and a revolving cylinder traveled over the form, moved by geared wheels at the end.

Print.—1. The impression from an engraving, as distinguished from the engraving itself. A print may be in good or bad condition; it may be from wood or from steel, or any other material and in any form. It must, however, be printed. 2. That which is printed, in distinction from that written, painted or spoken: "His writing was as plain as print." "Out of print" signifies that booksellers no longer publish a certain book and that they do not keep it in stock. It does not necessarily imply that it would be hard to get.

Printer.—1. One who follows the occupation of a printer, either as a workman or an employer. A practical printer is one who knows how to do with his own hands the work of a printing-office. A printer may be either a compositor or a pressman. Both are printers, and one has no right to claim this title more than the other. It would not have been thought necessary to insert this latter explanation only for the reason that it is frequently wrongly used by uneducated workmen. A printer who works for less than the recognized rates is called a "rat," and those who thus work are said to be "ratting." This is regarded as a term of great opprobrium among printers. A non-union man or a man who fights the union is not necessarily a rat. Organizations of printers in the United States are known as unions and in Great Britain as societies. Thus, one who does not belong to them is a non-union or non-society man. Such men sometimes speak of their places of work as "free" offices, as any one is free to work in them. 2. In English daily newspapers, the foreman, who in book offices is known as the overseer.

Printer's Devil.—A term often applied to the junior apprentice in a printing-office. See DEVIL.

Printer's Joiner.—One who makes cases, stands, reglet, furniture, &c., for printers.

Printer's Ream.—A perfect ream of 516 sheets.—*Jacobi.*

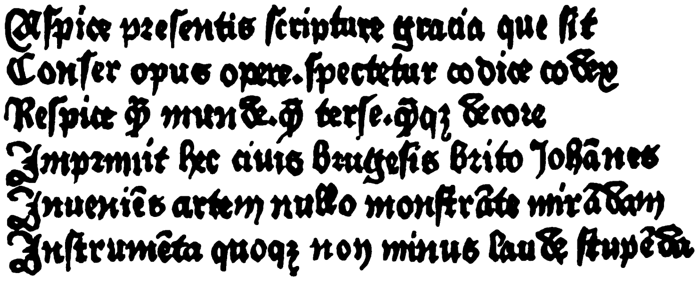
Printers' Marks.—In olden times many printers had their own particular emblems, and were identified by these marks. The subject is very interesting; but is too long to be entered into fully in a concise work like this. See DEVICES, PRINTERS'.

Printery.—A term applied to a printing-office.

Printing.—The art of impressing types, covered with ink, upon paper or other smooth substances. This definition really belongs to letter-press printing, other kinds of printing modifying it considerably. It is, however, impossible to construct an explanation which shall embrace all that it should embody and no more than it ought, as stamping in clay and impressions in metal with steel dies are not printing, although they are impressions. Printing may be divided into three classes. Typographic printing with type, wood-engravings and electrotypes depends upon the fact that the lines printed are raised lines; that upon them ink is deposited, and that pressure upon a sheet of paper from above removes most of the ink and deposits it upon the paper. Incised printing, generally known as copperplate or steel-plate printing, is where furrows or scratches are made upon the face of a plate of polished metal. Into these ink is deposited, the part which is left during inking upon the surface being wiped away before the impression is taken. Pressure upon the paper which is laid upon the plate forces it into all of the furrows, and the result is a very sharp and clean impression. The third kind of printing is the chemical or lithographic. Upon the surface of the stone rests a drawing made with greasy ink. The remainder of the stone is moistened with water. The ink used for each impression adheres to the greasy drawing, but is repelled by the water. When the pressure is applied the ink leaves the stone and adheres to the paper. LITHOGRAPHY is fully treated under that head, and in this article little will be given besides a general description of letter-press printing, every topic being more fully dwelt upon elsewhere.

THE CREATION OF EVE, FROM THE BIBLIA PAUPERUM.

The Assyrians attained to a species of printing somewhat similar to the blind-tooling of a bookbinder. Letters, pictures and arbitrary signs were impressed upon the surface of soft clay which was afterwards baked. They were skillful in this art, and succeeded in making their tablets and cylinders with neatness and permanence. The Egyptians used stamps for like purposes. In China printing from raised surfaces was invented nearly a thousand years ago, and before Gutenberg or the alleged Koster were in existence the Chinese art had been introduced into Japan. The desire of the multitude to have an innocent amusement led to the stenciling and printing of playing-cards in the fourteenth and fifteenth centuries, and religious primers and children's books were multiplied by the same agencies. The invention of printer's ink and the comparative ease with which paper could be obtained in the fifteenth century only needed to be supplemented by the invention of movable metal types. This was accomplished some time between 1440 and 1450, and printed impressions from the types thus made are still in existence and are much sought for, their dates being at various times since 1450. The work was rude; in many examples it was badly executed. After 1462 printing spread rapidly all over the continent of Europe. Italy was for many years the chief seat of productive industry in this line, Germany being second and France third; but within a hundred years the art was known everywhere in Europe. At first the press was no more than the ordinary wine-press; but very soon, or possibly almost at once, a movable bed was adopted, together with a frisket. No change was adopted for many years, when Willem Blaew, a map-maker of Amsterdam, made a number of improvements. This remained the standard for presses until 1802, when Lord Stanhope introduced iron instead of wood as a material, and made many other changes. Later improved forms were brought forward, including the Clymer, Washington and Smith presses in America, and the Albion in England, which have maintained their hold until the present time on much work, but which have been superseded to a large extent by machine-presses. Improvement in type-founding began very early. The original sizes were large ones, but printing had not been carried on very long before long primer and brevier ceased to be the smallest sizes of type, and nonpareil was introduced. Type was originally cast by the printers themselves, and if a sort was missing or deficient new letters could be cast at once, while redundant sorts supplied the metal if nothing else was at hand. Italic and small capitals were soon added, and characters were cut for Greek, Syriac, Coptic and many other languages which used neither the Roman nor the Fraktur letters. With the increase of the art and the greater size of the establishments the trade became subdivided, and improvements were introduced into each department. One hundred and fifty years ago most of the rules under which English and American printers work, in regard to style and form, had been evolved and were in use in England. Paper, the prime necessity of the calling, was known several centuries before it was necessary to employ it in printing, but it was very coarse and imperfect in texture. Baskerville, a printer of Birmingham, who had been in earlier life a japanner, introduced the plan of hot pressing the sheets. Cold pressing does not seem to have been known previously. By hot pressing much gloss could be given to the surface. The first great improvement in the manufacture of paper was in 1774, when chlorine was discovered, making it possible to manufacture white paper from rags which were not white. About the beginning of the century the Fourdrinier machine came into operation, by which the process of paper-making was immensely accelerated. Larger sheets could be made, and prices of the finished product were far less than before. Successive improvements have carried this machine to a very high stage of perfection.



Aſpice preſentis ſcripture gracia que ſit
Confer opus opere. ſpectetur codice codex
Reſpice q̄ munde. q̄ terſe. q̄q; decore
Imprimit hec ciuis Brugeſis Brito Johānes
Inueniēs artem nullo monſtrāte mirādam
Inſtrumēta quoq; non minus laude ſtupēda

EARLY FLEMISH PRINTING.

Not far from the year 1400 ink, another necessity for the printer, was first made with boiled linseed-oil or some equivalent material mixed with a pigment. All inks before that day were admixtures of a pigment with water. Other substances, such as vinegar, might have been introduced, but they were only secondary to the water and coloring matter. The first ink was made with much care, but it afterwards deteriorated, and in most countries the period between 1710 and 1840 showed a very inferior quality. Modern improvements have changed the kind of product, that now used being much more easily handled, better mixed and drying more quickly. Very few improvements were discovered in any of the arts of the bookmaker until about the beginning of the present century. At that time every European country and all parts of the United States had printing-presses in operation; but there were few elsewhere. Since 1800, however, every department has changed its procedures. The art has become popularized; its processes have been quickened, and the audiences to which it appeals have been greatly enlarged. The earliest books were those on theology, law and medicine. A hundred years elapsed before popular works were common. Newspapers began later. Originally they contained very little matter of interest; but the Napoleonic wars resulted in a great change in those of France and England. Journals likewise became more numerous elsewhere. When the improvements in the manufacture of paper were available swifter and stronger presses were required. The latter could be obtained by the employment of iron as the material for construction; but celerity demanded an entirely new construction. This was given by König, an ingenious German, who in 1814 printed the London Times on a press of his contrivance. Other engineers attacked the same problem, and in ten years a great variety of flat-bed cylinder presses had been invented. In 1823 they were introduced into Germany, and shortly after into France. In America flat-bed presses effecting an impression similar to the hand-press were in use in Boston and New York as early as 1823; but it was not until 1825 or 1826 that a cylinder press was employed on this side of the water. At about the same time rollers made of a composition of glue and molasses were substituted for the balls which had been employed for the four previous centuries. Roads, which until 1800 had been in a terrible condition in all European countries except France, began to be constructed much better everywhere; steamboats were in use after 1807, and railroads came twenty years later. These improvements placed the rural population of each country in close connection with its cities and enabled publishers to deliver their books and newspapers with ease. Newspapers increased very rapidly. In 1800 there were probably not a thousand different journals published in the whole world; it is believed that there are now nearly fifty thousand. The close competition between printers and publishers compelled each to make every effort to increase the quality of the out-turn at a given price, or to increase the production at a lower price. Printers had larger establishments, and their trade became subdivided. It was common seventy years ago to find expert pressmen who were at the same time expert compositors; now no one professes to be equally skillful in each department, and most men only know one of them. Even these classes are subdivided. Compositors are jobbers, news hands and book hands. Many have never worked in more than one line. The art of lithography began in Germany about one hundred years ago, and has made great strides since 1825. Letter-press printers recognize the fact that very much work can be better done by this process than by their own. Between twenty and thirty years ago machinery was invented which would enable the lithographer to execute his presswork at a greatly accelerated rate, and since that time a great deal has been done in competition with type-printers. In poster portraits, for instance, lithography has a monopoly. The colors which are used by it vary from seven to fifteen on ordinary work, but double and even triple this on some occasions. A great change has been visible this century in copperplate printing. Copper itself is rarely used, steel being substituted. Up to the end of the last century almost all engravings of merit were made by this method; but the blocks of Bewick showed that many engravings could be executed as well upon wood as upon copper, and the improvements in presses, enabling larger and more delicately executed work to be printed without crushing or slurring, have brought forward what is really a new art. The prints taken from them have a softness, clearness and delicacy previously unequaled, together with great strength and power. Copper and steel engraving have been comparatively neglected, except in bank-notes and similar evidences of indebtedness. Here the utmost care is displayed in engraving and printing. Portraits as well as maps are frequently made on copper or steel; but there is little general commercial use for the art in America, and comparatively little elsewhere. Most printing of copperplate work is executed in the same manner as it was done three centuries ago, processes being the same. A new art which enters largely into printing of the present day, and which has very seriously interfered with wood-engraving, is process engraving. In this the action of light reproduces the lines of a drawing or the closest details of a photograph. It is very much cheaper than any of the other reproductive arts, and gives every part with the closest accuracy. This method was unknown in 1863; it began to be considerably used twenty years ago, but is now everywhere an indispensable adjunct in printing. Many processes and varieties are known. Stereotyping, or a method of bringing together types in a solid mass, or making a cast from a page, has now been known for about two hundred years. Ged in the first half of the last century produced stereotypes substantially as they are still made, although not with the improved appliances and methods now known; but the opposition of workmen and the covert antagonism of employers rendered his labors nugatory. About 1800 Lord Stanhope, who had spent considerable money in attempting to solve anew the problem, began making plates. His method superseded that of Didot in France, and was introduced into Germany before 1820. It was a great step forward. It was improved in America, but the plaster process has since been entirely superseded by electrotyping. Paper somewhat like a pulp was introduced as a material for a matrix on the newspapers of London and New York about 1860. It possessed the quality of bending without breaking. It could therefore be taken from a flat form, curved as it should be, and then have the metal poured upon it, producing a cylindrical plate. This is indispensable in printing daily newspapers. Electrotyping has been in use on some objects for more than seventy years, but experiments were made more than fifty years ago with it in relation to type. In 1842 a book was printed in New York with electrotyped cuts, but the art can hardly be said to have been introduced before 1849 or 1850. The galvanic process enables the finest details to be followed, and its use for such purposes has enabled it to drive its sister art completely out. No printing-office requires two different sets of apparatus producing on general work substantially the same result.

The great cheapening of paper in the countries of Europe and America seventy and eighty years ago not only accelerated the newspaper press, but gave a great impulse to book publishing. Many more books were printed, and men who did nothing except write them, although not of commanding genius, became common. Schools were established everywhere in America, and many more were instituted in England. "The schoolmaster was abroad," and his pupils required knowledge. This they were afforded by Brougham, Lardner, Knight and others. The machine-press was used on these works, and the opportune discovery that cloth stretched over pasteboard made a covering good enough for ordinary books reduced the cost of binding to one-third. Edition binderies became common. The publisher no longer relied upon wealthy or aristocratic families as his sole purchasers, but his books were sold everywhere. They were made more attractive by wood-cuts, and the cost of recomposition was done away with by the use of stereotyping. Another form in which publishing is differently conducted from that which existed in the early years of the century is in the preparation of polygraphs or of encyclopædias and dictionaries. These were infrequent during the reign of George III.; they are now numerous. The subscription-book trade has become large and so has the production of magazines.

Of all the influences, however, which have increased the demand for the printing art the greatest is the multiplication of newspapers. It was to aid the London Times in getting out its edition quickly that the first successful power-press was made, and it was by newspapers that demands were made for a still quicker press and for the use of steam as a motive power. In this the newspaper just mentioned took a very important and honorable part. Its enterprise and its great wealth gave it means to conduct experiments, and it was in its office that many improvements were first introduced. In some, as in rotary presses, it happened by circumstances to be second, although endeavoring to be first. The successive improvements on newspapers were the perfecting-press, the two-feeder, the four-feeder, the type-revolving rotary and the web press, the latter having been made possible by the use of stereotyped cylinders. No daily paper at the beginning of the century probably printed more than two thousand copies a day; one in France now much exceeds half a million, and a large and amply filled one in London passes beyond a quarter of a million. The revenue derived from the sales and the advertisements has permitted the employment of experts in the manufacture of all appliances, and has much stimulated invention. A problem with which American newspapers are now engaged is the production of engravings in several colors at the rate of twenty or thirty thousand copies an hour. Such printing has already been done, but without good results artistically. One effect of the growth of newspapers has been that a new occupation has been created in connection with it—that of writing every day for immediate publication. Many of those persons who do this also devote considerable time to the preparation of books, so that both the book publishers and the newspapers have now sufficient assistants of ability to meet their needs. When Jeffrey was conducting the Edinburgh Review seventy-five years ago he had considerable difficulty in finding writers; that difficulty no longer exists. Another result of the increase of printing in newspapers has been the creation of newsdealers and advertising agents.

Until about 1830 very little was known in America about what we now term job-work, and still less elsewhere. All tradesmen's bills were carefully written out; business cards, if there was a necessity for having them, were engraved, and all of the various small work of the job printer was unknown. Punch-cutters had, however, begun engraving what is now known as fancy letter, and each succeeding decade saw a great increase in the number of styles. When small presses came into vogue an easy method of printing cards and circulars was available, and about 1852 colored inks began to be regularly manufactured. There thus grew up a class of work of great beauty judged by former standards, to execute which only certain men were available. With this small work were associated pamphlets, circulars and reading matter in the form of books, but intended for the advancement of personal interests. Originally all jobs were executed in connection with newspapers, the owner of the newspaper also conducting the job office; but when newspapers began to assume their present great proportions it was seen that equal care could not be exercised over each, and that therefore the job offices might better be parted with. In all villages which have passed beyond a thousand inhabitants there is generally a job office; small cities have several, and larger ones have at least one office to every three thousand population. Several of these in the United States employ in their various departments over five hundred hands each; one employs nearly a thousand. The work is complex beyond description, and every effort has been made by those who supply them with tools, machinery or other things to improve them and give them variety. More variation has been made in such articles within thirty-five years than in the whole previous history of the art.

One of the improvements which have not yet become of much commercial importance is in regard to the method of setting type. Formerly every type was laboriously placed in the stick by hand. Now machines, operated with keyboards and struck like pianos, do this labor very much more quickly and at very much less cost than formerly. The first machine used for any extent of time was the Mitchel, which was employed about 1855, but there has been a continual succession ever since. The letters are either dropped into a channel or their matrices are brought together and a solid line is cast from them. Nearly three hundred machines of all kinds are now in use in America, and it does not seem unreasonable to believe that they will soon exceed a thousand. These improvements are not known in the United States alone, but are found in all countries. A device produced in Germany, which proves to be of advantage to the printer, will before a great time be in use in Chicago, in Melbourne and in Edinburgh.

A summary of the progress of printing in the UNITED STATES will be given under that head, and much will be found respecting its general history elsewhere. Perhaps the most marked feature of the changes of the last century has been the great increase in importance of America in this respect. Little printing was executed in the United States in 1793; less probably than in Holland, Denmark or Bavaria at the same time. It long ago passed by all of those countries, more printing being now executed in each of several States of the Union than in either of them. In its totality more printing is done in the United States than in Germany, France or England. More capital is employed; more men are given work; more sheets are printed. Our great production is in four branches—newspapers, magazines, job printing and school-books. In the first and third of these the quantity executed is probably double that of any other land. In books of special knowledge we are, however, still far behind the presses of England and Germany.

Details of various matters relating to the growth and improvement of the art will be found under each of the technical heads, but more particularly under INVENTION OF PRINTING and TYPOGRAPHY, the last being intended to contain any new matter in reference to the origin of the calling. For an explanation of the way the art is now divided and carried on see PRINTING-OFFICE.

The principal practical books of reference for printers in relation to the conduct of business are as follows, the more important historical works being indicated by a star and the practical ones by a dagger: *Moxon's Mechanick Exercises, London, 1686; *Smith's Printer's Grammar, London, 1755; *Encyclopædia Britannica, ninth edition, article Typography; *Invention of Printing, by Theodore L. De Vinne, New York, 1878; *Life of William Caxton, by William Blades, London, 1876; *History of Printing, by Isaiah Thomas, Worcester, 1810; Stower's Printer's Grammar, London, 1808; Adams's Typographia, New York and Philadelphia, 1835 till 1860; *†Typographia, by Thomas Curson Hansard, London, 1825; *History of Newspapers, by Frederick Hudson, New York, 1872; *Census of 1880, monograph upon newspapers, by S. N. D. North; †Typographia, by J. Johnson, London, 1824; American Printer, by Thomas MacKellar, Philadelphia, various dates since 1866; †Printer's Grammar, by Thomas Lynch, Cincinnati, 1858; †Practical Printing, by John Southward, London, 1893; †Dictionary of Printing, by John Savage, London, 1842; *†American Encyclopædia of Printing, by J. Luther Ringwalt and Jessie Ringwalt, Philadelphia, 1872; Printers' Vocabulary, by Charles Thomas Jacobi, London, 1888; †Punctuation, by Henry Beadnell, London, 1885; †Punctuation, by John Wilson, Cambridge, 1871; †Printer's Price-List, by Theodore L. De Vinne, New York, 1872; Process Engraving, by W. T. Wilkinson, London, 1890; †Process Engraving, by C. Schraubstadter, Jr., St. Louis, 1891; †Le Compositeur, par C. Daupeley Gouverneur, Paris, 1880; *†Dictionnaire Typo-Lithographique, par Henry J. Tucker, Paris, 1882–1896; †Illustrirte Encyklopädie der Graphischen Künste, von Alexander Waldow, Leipsic, 1884; *Illustrirte Geschichte der Buchdruckerkunst, von Karl Faulmann, Vienna, 1882; †Rules and Usages of the Trade, published by the Typothetæ, New York, 1893; Printing-Machines and Machine-Printing, by Frederick J. F. Wilson, London, 1880; †Handbuch der Buchdruckerkunst, von J. H. Bachmann, Weimar, 1876; Manuale di Tipografia, da Giulio Pozzoli, Milan, 1861; Handbuch der Buchdruckerkunst, von Carl August Franke, Weimar, 1886; Electrotyping and Stereotyping, by Frederick J. F. Wilson, London, 1881.

Printing-House.—An ancient term for a printing-office.

Printing in Colors.—By color a printer understands every other hue, tint or pigment than black. Even white to him is a color. It has long been very desirable to discover some method of handling colors so that they may be printed without a largely increased expense, thus diversifying the work. Much more fine printing would undoubtedly be executed if this difficulty could be conquered. The early printers left a blank space at the beginning of chapters for initial letters, which were afterwards painted in by some skillful hand. These black and heavy pages were much improved by this practice. After a little the letters were printed in red instead of being drawn, the form going on the press a second time for this purpose. From that time until now printers have occasionally attempted printing a portion of their work in colors; but the processes followed have been very expensive; few masters have charged enough for their work, and consequently have nearly always lost by it. Customers fail to see why this work should be so costly, and many offices decline to undertake its production at all, as it is generally a thankless job.

Several causes have united to damp the enthusiasm of those who love bright colors. Excepting for type-work, the colors are too staring, too perceptible, if compounded as men generally mix two or three. It is a waste of ink to cover the rollers and to wash them off again; the fountains and the ink table must be cleansed, wasting still more; and, worst of all, it is impossible to work one color over another until the first has completely dried, as a certain portion will rub off. Few printers have had experience in this line, and each time new experiments have been required. Thus little progress has been made except in houses doing little other work, and these have not been profitable enough to demand much capital.

The easiest way to print in colors is to set up the whole form and lay it on the bed. Then raise the lines or letters to be first printed by underlaying them with thick cardboard not thicker than a nonpareil, the form being then locked up again. To allow for the height of the type the packing on the cylinder is partly cut away in these places. When the first color is printed take out the lines or letters, fill up the space with quadrats of the same size, and then print it again with the second color. Another plan, after a form is all carefully set up, proved and corrected, is to divide it into two, placing the part which is to be printed in one color in one chase and the other color in another chase. All of the furniture must be of metal, and the chases must be perfectly square and true. These forms are worked one after the other, the red lines of the one fitting exactly into the blanks of the black. When more than two forms are required, as for instance with three or four colors, it is frequently found expedient to make electrotype plates, then cutting away the parts which are not to be printed. One plate is required for each color. In doing this care must be taken that the electrotypes are exactly equal in size and trimmed perfectly square. The copper upon them is acted upon by some mineral inks, and therefore it is often desirable to have the plate covered with nickel in the battery, that not suffering any change through mercurial action. The difficulty which arises in having two or more forms is in regard to register, as there is a possibility that the second form may not strike in exactly the proper place. This danger has, however, been reduced to a minimum by modern presses, which are very exact.

Another method of printing in colors may be mentioned. The rollers are divided into parts, each of a few inches in length, and against each one of them are separate fountains containing a different color of ink. When printing begins the sixteenth page may be in sepia, while the first, its inseparable companion, is in blue. This work is best done on open forms. The rollers vibrate as usual, or they can be held rigidly in their places. When this plan can be adopted it is the swiftest and cheapest of all color work on flat-bed presses.

Painted sheets are frequently seen. Such sheets can be obtained from the paper-manufacturer, who has only to paint one of the rollers against which the paper comes after it has reached nearly the end of the machine. The paint is a soft water-color or dye, and is supplied to the roller by brushes rotating in little vats beneath. The same device can be used when the paper is wet down from the roll. It must then be unwound and wound up again, and the charge of color can be imparted at the same moment.

Three great difficulties arise in keeping up the purity of the color—the certainty of offset and the difficulty of determining what the effect of a certain mixing of colors or the superposition of one color upon another may be. The pigments are not pure coloring matter, and they are not transparent. It cannot therefore be predicated from a study of color abstractly what the effect of the admixture of one ink with another may be. Red, blue and yellow when mixed together ought theoretically to form a white; in effect they form a dull brown. Equal quantities of black and white do not give a black somewhat lightened; they form a mouse color. Thus the results of admixture must be taken as shown in practice. Conjointly with this must be considered the cost of each ink and its extensibility, or power of covering the lines properly. Some inks have so much weight that three times as much is required to cover a form as will be necessary with another ink. Unless, therefore, there is some great advantage in the heavier ink, the lighter one should be used. The most common ink is a black, and its quality is also the finest. An ordinary black ink costing one dollar per pound is usually as good as a five-dollar colored ink. White ink is also cheap. Wherever, therefore, black can be used in colored printing, or wherever white or black can be used to advantage in combination with another color, it should be done, as the cost is less. There are two common methods of diluting or spreading out color. One is by the use of white ink and the other by that of varnish, or printing-ink without an admixture of the pigments. It has practically been found on small work, where the quantity is not very great, that white ink is preferable. The purpose is better answered.

Whoever enters upon printing in colors on small work as a specialty must have a considerable variety of inks from the factory. As a rule they should be full-bodied, or having as great an amount of pigment in them as the varnish will properly hold and admit of working well. There should be at least a light and dark green, a light and dark yellow, a light and dark blue, a bright red and a dark red, a purple, an olive, an orange and a gray. Besides these there must be black, white and varnish, with the various bronzes, which are glittering particles laid on the varnish after the work is printed instead of coloring-matter mixed into the varnish before printing. All colors can be procured from the printing-ink manufacturers if there is time enough to wait, but those who aspire to be masters in chromatic typography should also mix many of their colors, and occasionally it is absolutely necessary for them to do so. Caution is necessary that varnishes incompatible with each other shall not be thus joined. The plan recommended by Earhart in his book is to take the original inks by measure instead of weight, determining the quantity in brass rings of various diamters like those employed as borders around jobs. They are laid on a marble slab, and thus after measurement the inks can easily be taken out with a knife and mixed with each other. After determination of sizes the outside of the rings should be marked, so that there shall be no difficulty at a future time in ascertaining the quantity which they hold. The mixing should be very thorough.

One thing should continually be kept in mind by the color-printer who desires to have his work give him some return in money as well as enhance his reputation. He must keep down the cost of his inks, and he must endeavor to execute his work in as few printings as possible. A deep blue will usually answer for the dark color of a job, and therefore there will be no need of a black. A deep blue over a red or a rose lake will also give nearly the effect of a black. With two colors a third can be made, one being printed over the other; with three colors five can be made, and with five or six a very large number indeed. The lower color partly shows through and modifies the upper color, in some cases very little change being effected, but in others very much. When the foundation-color is very deep the bright one superimposed loses most of its brilliancy; but when one bright color is placed over another which is also bright the result is frequently admirable. Among those double printings which look the best are yellow over red, yellow over purple, yellow over gray, blue over rose lake, orange over blue, orange over gray, green over red, and rose lake over deep blue. Those which are not happy are black over yellow, purple over green, purple over yellow, green over purple and blue over yellow. Red over deep blue differs little from red over black; yellow over deep blue and yellow over black are much alike, the latter having a green tint; and blackish hues are produced by blue over red, deep blue over red, deep blue over rose lake, and of course all the cases where black is printed over any dark color. The most brilliant simple colors are the reds, yellows and oranges, the showiest compounds being red over yellow, yellow over red, yellow over gray, orange over green, orange over gray, rose lake over yellow, and gray over yellow. The greatest blackness is attained by blue over black, the next by black over blue, then black over black, and last by black over dark red. Peculiar colors well worth a trial may be found in red over green, red over gray, red over blue, red over deep blue, red over black, yellow over red, yellow over purple, yellow over gray, yellow over blue, yellow over deep blue, yellow over black, blue over red, blue over rose lake, orange over blue, orange over green, orange over gray, green over red, green over gray, purple over gray, deep blue over rose lake, rose lake over green, rose lake over gray, rose lake over blue or deep blue, rose lake over black, gray over red and gray over yellow; medium green over scarlet, deep orange over dark green, lemon yellow over magenta, medium green over magenta, deep orange over ultramarine, magenta over lemon yellow, violet over lemon yellow, lemon yellow over violet, scarlet over medium green, deep orange over medium green and medium green over deep orange. These colors can be much altered and toned down by having one of the two blocks or letters in tint lines. If these lines are very close together the color will be much unlike what it will be if they are far apart.

By the admixture of colors an endless variety can be made. The easiest and cheapest mixtures are with white and black. A common method is to print a bright color in a central line; the same color mixed with considerable white is used for a background or for a border, and the same mixed with a great deal more white is used in the least important parts. The effect is frequently very happy. A mixture of black alone with any other color is usually speaking inadvisable; but black and white are mixed with red, yellow or blue occasionally with much success. Black is frequently relieved with a little red or blue, thus constituting the so-called art-blacks; but the farther the result is removed from a true black or a black inclining to blue the less becomes its legibility. As a rule only the tint used for the main part of a large form is in these modified blacks; most combinations in small quantities are made with other colors. In Earhart's diagrams many very effective colors are shown, some of which are unusual. No name can be given to most of them, as they do not bear close resemblance to any natural object which has a well-known color. They are abundant, however, in cinnamons, olives, dark greens, chocolates, and all of the middle tints. An examination of these shows that the original colors are frequently not compounded as would be imagined. For instance, admixtures of black and yellow often have a greenish tinge, thus proving that there must have been a portion of blue in the black. It is the lack of knowledge by the printer of the ingredients first used which frequently baffles him in his efforts to obtain a certain effect. A convenient method of experimenting in colored inks is to take red, yellow and blue of about the same grade and mix them according to proportions. Many customers will not object to having an order executed in a tint if not too bright, and some of these combinations can be tried on very ornate work. They can be mixed, for example, as follows, the colors being abbreviated and the quantities denoted by figures: Y 1, B 1; Y 1, B 1, R 1; Y 4, B 1; Y 8, B 2, R 1; R 8, B 1; Y 2, B 16, R 6. It will be seen that the total number of these changes would run into the thousands, and if green, orange and purple were added no computation could be made as to the total permutations. The printer who is experimenting in this matter needs to keep a note-book and to mark in it both the successful and unsuccessful effects, with a little of the printing, if possible.

One form of color-printing now popular is the monochrome. Engravings frequently have an added beauty lent to them by this method. Blue, burnt umber and sepia have been much used for this purpose. Engravings have also been printed in two colors, neither adhering to nature, but with happy effects.

Clearness and brilliancy are imparted to color-printing by a second presswork exactly over the lines of the first. As in a house three coats of paint are better than two, so two impressions give a better color than one to the printed sheet. In many cases where this should be thought desirable a cheap color may be used for the first impression. There is a peculiar richness to double impressions not elsewhere to be found. Weak colors particularly, such as yellow, are improved. The finest black is made by printing blue over black. Many bronzes have a new tinge added to them by subsequent presswork.

Recent researches into the principle of color have induced a number of photographers and printers to hope that they can print direct from process plates which have not been manipulated with the chisel, and that in four or five printings, possibly in three, all colors and tints can be represented. This theory is very different from the one now prevailing in color-printing. It demands in the first place transparent inks which shall give the same effect when one is laid over another as when the two are mixed. At present yellow over black produces one tint, black over yellow another tint, and the mixture still another. The colors really should be so transparent that there can be no appreciable difference between them. Secondly, there must be a method of modifying the plate so that an orange which is chiefly red can be shown as well as an orange which is midway between red and yellow. Otherwise there will be, out of the three original colors, only eight in all, the red, yellow and green being supplemented by the orange, green and purple, and all of them by the grayish brown which is the result of the combination of the whole. These two objects are accomplished by photographing an object three, four, five or as many times as it may be desirable in succession, between the lens and the negative there being colored glasses which will stop out some of the rays. One kind of glass stops out all rays except the red, another kind transmits only the blue, and another kind the yellow. The rays of the sun pick out these colored beams better than the artist possibly can, showing the most insignificant proportions of one hidden in another and predominating color. Three plates are made. When the first is printed all of the red appears; the second shows the yellow, and the third the blue. When these are complete all of the colors are there as in nature. Such is the theory, and to make this theory practice much ingenuity has been shown. The process, it is understood, originated in France, but several firms are now engaged in perfecting it in America. The difficulty of turning masses of color without sharp outlines or figures into lines, as is necessary for reproduction on the press, is something felt in all process work; but the ordinary limit of fineness in plates is about the one hundred and fortieth part of an inch. Should lines of the same thickness be used in color-work it would be difficult to cause them to be faint enough where the proportion of one color was small, and numerous enough where the proportion was great. It would be hard to grade their relative proportions. Yet this is necessary if a close resemblance to the original is demanded. The second color will always obscure the first, and the compound of all colors bears no resemblance to white. At present, therefore, each plate must be doctored. Here parts must be toned down, and there lines and masses must be strengthened. To how great an extent this will be required depends upon each subject. After the plates are finished and the colors experimentally printed, a few copies being completed, an experienced artist must be called in to subdue or heighten the negatives or plates. This will undoubtedly be a cheaper and better plan than that now followed, but it requires very ingenious manipulation and a high artistic sense. It should perhaps be stated that some of the work executed in this manner in three printings has been examined by printing experts of New York. They declare that they think the general appearance could not be equaled under less than seven or eight printings by the present method, and that the reproduction is very pleasing and natural.

The greatest difficulty under which the color-printer labors is offset. He avoids this at present by allowing his sheets to dry from one to six days, which prevents him from taking hurried jobs. A certain proportion of ink will leave the sheet upon which it is printed and attach itself to whatever touches its surface, whether it is the finger, the fly, the metal portion of the machine, the offset sheet or the sheet printed immediately before or after it. Black ink dries tolerably well in a day, but in many cases this is only a superficial drying. Underneath the surface the ink has not solidified. If, therefore, at the end of that day this sheet passes through the press again, and a portion of the ink from the second presswork covers a part of the printed surface received from the first presswork, it is probable that the new ink will more or less liquefy the crust. Instead, therefore, of the second printing being dry in twenty-four hours, it is probable that it will take twice that time. This tendency to liquefaction of the lower strata happens with each new impression and hinders the last from drying. Not only does the first printed ink get soft and mix with that from the second printing, but it is torn away and deposited upon the roller, thus deteriorating all of the color afterwards laid upon the types. The more rapidly this is done the greater the danger. A number of methods for counteracting this injury are known. Chalk or powdered magnesia upon the surface will prevent the offsetting, unless under considerable pressure; but the hues are dulled. Inks are now made which dry very quickly, the oxidization proceeding very fast; but in none do they take less than six hours to pass from the liquid to the solid state. Passing through hot rolls, after the manner of Gill's hot-rolling machine, dries the ink very rapidly, but the paper wrinkles somewhat. All methods of artificial drying with heat are subject to this objection. The plan of using a composition roller to take off extra ink and that of using offset sheets are spoken of before. There remains, then, only the plan of mixing the ink with something which has no offsetting quality, but adheres better to itself than to any other thing. It also generally gives a gloss. Which of these plans shall be adopted depends upon the pressman or upon him who directs the pressman. All of the methods are imperfect.

Of late the proprietors of daily papers have attempted to print advertisements or portions of their issues in colors. In some respects the conditions have been unfavorable. The best blues, yellows and reds could not be employed, as they were too costly and hung to the paper with too great a tenacity; but of the register there could be no doubt. In printing a daily newspaper the web runs over one type-cylinder under the impression-cylinder, the former being inked by rollers which touch it continually. After the paper has passed between them it is cut off, pasted and folded; but there is nothing to prevent the same web from proceeding from a cylinder printing black to another printing red, a third blue and a fourth yellow. Could the offset be avoided a dozen cylinders in succession might be employed in this way, thus finishing a picture at once in many tints. The first type-cylinder is in black. Out of it are cut by the chisel the parts which are not to be printed. The next type-cylinder has nothing upon it except the few lines which are to be printed in the succeeding color, and the third cylinder has still other words or portions of the design, the greatest part of the form being blank. The method of preventing offsets at present practiced is to use an ink with very little oil in it, practically a water-color.

Reference is made to the articles in this Dictionary upon COLOR and PRINTING INK, and to the diagram in the former. The most valuable book on the subject is Earhart's Color-Printer, which is full of knowledge, and shows how desired effects can best be accomplished.

Printing-Ink.—The substance used to render legible and permanent the impression made by type upon paper. It is of many colors and many grades. It bears little resemblance to other inks, as writing-ink sinks into paper and dries there. Printing-ink, on the contrary, is more like a paint. It lies chiefly on the surface, dries slowly and forms a hard and unalterable solid upon the top. It has peculiar qualities. It must change from the soft adhesive form in which it is applied to the type to become perfectly hard and dry after it has been deposited on or transferred to the paper. This change of condition must have a certain rate of progress and to some extent be under control. When manufactured some time generally elapses before the product is used, and during this period it should not alter in the smallest degree. In fact when the air is excluded from it it should keep for any length of time. During its application to the type its solidification should be as slow as possible. The change of state should not be accompanied by the deposition of consolidated matter in the ink, as this impedes the pressman and proves a loss to the printer. Printing-ink should, moreover, have an oleaginous character; it ought to be very glossy and perfectly free from any granular appearance. If on the extraction of a small portion from a mass it leaves only a short thread suspended it is considered good. The best test of its consistency is the adhesion which it shows upon pressing the finger against a quantity of it. Having been applied, its action must be confined to a very slight penetration into the paper—just sufficient to prevent its detachment without materially injuring the surface of the latter. It likewise ought to dry in a very short space of time.

Printing-ink is composed of two different substances, one an oil or gum and the other a coloring matter. Of the latter any kind which can be ground or triturated may be used; but the pigment is of a higher character than that used by painters, and it must be better ground and better prepared. The material for black inks is usually obtained by the combustion of tar, naphtha, rosin or other substances which yield much smoke. In America the principal coloring matter used in ordinary inks is gasblack, the gas being burned out at the gas-wells and the soot gathered. It is very light. A barrel contains only fifteen pounds, and if packed by hydraulic pressure it weighs no more than fifty pounds. It has no particular grain, breaks easily in the fingers, and is of a dull, grayish black. The quality of the ink very largely depends upon the quality of the lampblack or carbon-black obtained. Several different degrees of fineness can be made from the same combustion. Whatever substance is used burns with considerable smoke, and the soot made is either carried off into the air or deposited in the sides of the chimney or smoke conductor. No fire can exist without the consumption of much carbon and the introduction of much atmospheric air. The current must be continually in motion at the discharging end of the chimney. Consequently all of the fine particles which are thus carried away are lost to the manufacturer. The particles which are deposited at the sides of the flue on shelves or in pockets are saved; the heaviest and coarsest are first dropped, as the current of air is not strong enough to hold them. Then the next heaviest are deposited, and this lodgement continues until the end, when the finest are left. Nature does the selection. After the carbon-black reaches the factory it is ground and reground, if necessary, after which it is mixed with oil.

Linseed-oil, rosin-oil or Canada balsam serve the purpose of causing the little particles of black to spread equally upon the rollers, to be applied evenly to the type and to cause it to adhere to the paper. There it dries, but still adheres in drying. The varnish or oil does not modify the color, which depends upon the pigment. There are two usual varnishes, one made with linseed-oil and the other with rosin-oil. The former is used for the better qualities, and the latter for the lower grades. Linseed-oil is purified by digesting in partially diluted sulphuric acid for some hours at the temperature of boiling water. Afterwards the impurities are allowed to subside, the acid being then washed away with repeated additions of hot water. The water after this treatment is pale and turbid, and if the acid is completely washed out there is scarcely any odor. By rest the oil clarifies, and has then a pale lemon color, and dries much more rapidly than before. The purified oil is next partially rosinified by heat. For this purpose it is introduced into large cast-iron pots and boiled until inflammable vapors are freely evolved. These are ignited and allowed to burn for a few minutes, after which they are extinguished by placing a tight cover over the boiler. Ebullition of the oil is continued until on cooling a firm skin forms on its surface, known by placing a drop on a slate or other smooth, cold surface. While boiling continues, which is for two or three days, the varnish is constantly in motion. The object of boiling is to render the oil stiffer and more tenacious. Rosin-oil is made by putting rosin into huge retorts where it is distilled and redistilled. Rosin-oil is incompatible with some colors; it does not form a good compound with linseed-oil, and is best used separately. When the varnish and the pigment have each been properly prepared the two are ground together. This is done by a machine in which there are two rollers close to each other, rotating in opposite directions, and one much faster than the other. On these rollers rests a mass of ink. Between these the ink is ground very thoroughly, and the process is completed by another grinding. The varnish is alike through its entire extent, as is the coloring matter, and the object of the grinding is to mix the whole together, so that there may be no more of the pigment in any one portion than another. The relative quantities of varnish and coloring matter vary in different work. The ink employed in lithography is much stiffer and heavier than that employed in typographic work, having more coloring matter in a given quantity; perhaps one-half more is employed. If much varnish is used more space will be covered. Greater blackness is imparted by employing more coloring matter, and a still greater gloss by the use of Canada balsam or of gum-copal.

Besides gas-soot, blacks from ivory, grapevines, bones and other substances are used. The latter kinds of black are imported. That made from grapevines is used for steel plates. For the higher grades refined petroleum is burned. Other substances used for varnish are Canada balsam and turpentine. Ink prepared solely from varnish and coloring matter dries very slowly; but this is counteracted by mixing with driers or substances which oxidize rapidly upon exposure to the air. The article most largely used for this purpose is lead in all of its forms. Manganese is also much employed. By the action of oxygen upon these substances the varnish mixed with them is rapidly solidified. Soap in its fine, transparent form is frequently used. Ink into which soap has been incorporated has more affinity to paper than to type, and comes off easily. It also imparts a certain gloss. All substances which in a pulverized state yield color can be used in the manufacture of inks, whether vegetable or mineral. Some, however, like ultramarine blue, are very hard and intractable; and others which have a brilliant color in nature are not available. See COLOR. Aniline colors are much utilized at present, either by themselves or in combination with other substances. They were introduced some twenty-five or thirty years ago, but were at once objected to because they faded rapidly. Since that time much improvement has been made in them, and some are now reasonably permanent. Colors of an inferior brilliancy are now stained with aniline solutions, giving the printed matter great beauty when it is first turned off, and keeping this brightness for a long time when not exposed to the rays of the sun. When so exposed, however, the aniline is destroyed by the light, and only the duller and more durable color remains. As, however, the greatest portion of job-work is looked at only for a few days or weeks, this has not prevented the use of this distillation from coal-tar. The aniline materials are chiefly imported. The color used the most is black. After this follow red, yellow and blue; green comes last. Much white is employed. Many colors are formed by an admixture of two or more pigments. Thus black as ordinarily made has a tendency to grayness, which is prevented by the admixture of charcoal or a blue. See PRINTING IN COLORS. Ink is packed in barrels, kegs, tubs or cans, and lately some fine inks have been put into collapsible tubes like those employed by artists.

There are many varieties of inks. The lowest grade is that employed upon almanacs and cheap newspapers. Some daily newspapers feed their presses with ink from a tank with which communication is effected by pipes. Of course, such inks must be very fluid. Other inks are those for ordinary bookwork, fine bookwork, cuts and cuts on surfaced paper. Newspapers require ink of less substance than that which is needed for bookwork, which must be tolerably stiff. For wood-cuts the ink must be fine. The qualities of the material to which the ink is applied furnish an additional guide in this matter; thin paper must have a soft ink, which works clearly and is not too adhesive. Posters with large wood-types require a semi-fluid ink, but one not surcharged with oil. Ink for surfaced paper should be very fine, but with little adhesion, as otherwise it will tear off the surface of the paper.

Printing-ink or any substance resembling it was not known to the ancients. It made its first appearance not very far from the time when painting in oil began, about the year 1400. Prior to that time painting had been in water-colors. Printers required for the use of their art an admixture of oil with coloring matter, just as the painters did, but needed it more exactly prepared and with a greater proportion of fluid. De Vinne is of opinion that the invention of printing-ink was concurrent with that of types and by the same man. They were necessary complements to each other. For many years printers were obliged to make their own ink, as they did their tools, and there was a great difference between results. Some made an ink which was very clear and distinct, while others prepared that which was gray, weak and indistinct, much of it having very little affinity to the paper, because the linseed-oil had not been properly boiled. It is a mistake to believe that the color on early printed sheets was always good. What leads to the general conviction among bibliographers that the printing of the cradle age has never since been excelled was the size of the type, the width of its body-marks and the firmness of its serifs and hair-lines, coupled with the fact that a slow impression was given on wet paper with abundance of ink. If the reader will turn back to page 41 and look at the fac-simile of the Bible of thirty-six lines there given he will see that it would be possible on wet, rough paper to use at least one-half more ink than is there shown, and he knows that the original from which this reproduction was made was sharper and more distinct than its copy. All early books were printed with full color, and the pages were set off with painted letters in bright red, blue or green, at the head of chapters. Our present taste is for fine hair-lines and the least ink possible, so that there shall be no grayness. The ink continued to vary greatly from that time until the present century. In most countries and most places it was poor. To this there were many exceptions. The improvement in the ink of to-day began, however, with Baskerville, who made an ink far better than his contemporaries. Bulmer some years later succeeded in equaling him, and in Hansard's opinion Bulmer's Shakespeare was as fine a specimen of presswork as was ever seen. "Of the whole nine volumes, from the first till the last, being as many years in hand, the same harmony of tint and richness of color prevail as if the ink had all been made at one time and the last sheet inked by the same hand in the same hour as the first; this single work probably comprises more pages than all that Bodoni ever printed."

Nearly all of the first printers of America made their own ink. They could not depend upon the regularity of the vessels which traded to England. Rogers & Fowle of Boston were the first printers of this country who could make good ink. This was between 1742 and 1750. We see by the productions of Parker, Rivington and Franklin that they succeeded in manufacturing or importing a very good quality. During the Revolutionary War the trade was in great straits for ink. One of the prominent printers of Philadelphia used fish oil as his medium for incorporating lampblack. No regular manufactory existed in the United States before the year 1800, although the productions of Isaiah Thomas and Mathew Carey were very creditable. In 1805 the Faustus Association of Boston, an organization of employing printers, recommended the ink made by J. M. Dunham of Cambridgeport as the best. It is plain, therefore, that there were then more makers than one in the country. At about the same time Charles Johnson of Philadelphia began its manufacture, and a short time later Prout of New York. Both were successful. The former establishment still exists, while the latter lasted to the time of the Civil War. In 1816 George Mather and J. W. Donnington, two pressmen of New York, united in the manufacture of this article and were successful from the beginning, although Donnington withdrew after a year. An offshoot from Mather's establishment was that of J. G. Lightbody, and about 1852 H. D. Wade began business. Since that time many others have been added, who will not be particularized, but whose productions are most excellent. It is believed that there are now about thirty printing-ink makers in the United States, their manufactories being chiefly in the outskirts of the large cities.

Colored inks were first regularly made by Booth of New York, who was a printer, and who began theatrical and show printing. They were for his own use. Until 1840 very little was used except vermilion. After that time much was imported from Germany and England, and Wade began their manufacture almost concurrently with his entrance into this trade. All makers now produce colored inks of whatever shade or quality may be desired. Some book and wood-cut inks are still imported from England, and inks of all kinds come from Germany. The production of ink is no longer empirical, but is carried on by rule and watched by chemists who have received a thorough technical training. Ink is now very much cheaper than at any former time. For six cents a pound or less the great daily newspapers are supplied with the kind they need; that which costs twice or three times this sum will answer for weekly papers, and ordinary bookwork is executed upon that which varies from twenty-five to fifty cents. That which is worth from sixty cents to a dollar will do very superior work, while the proportion for which a finer quality is required is very small. Stower gives the values at the time his book was published, the year 1808. The highest rate was 10s. 6d., probable present equivalent $2; second quality 7s. 6d., present value $1; third grade 5s., present value 50 cents; fourth grade 2s. 6d., present value 25 cents; fifth grade 1s. 6d., present value 12 cents; sixth grade 1s. 4d., present value 7 cents. The lowest grade, however, was probably better than our present lowest grade, except in manipulation, and the highest grade was not as good as our two-dollar ink.

Printing-Office.—The place where printing is carried on. In printing alone is a manufactory or workshop designated as an office. This arose from the practice of the earlier printers, whose works were chiefly in Latin, and who adopted a convenient Latin term. See Office. Occasionally it is now called a printing-house, an appellation which formerly was very common. To use the term shop or factory is in American ears highly incorrect. A printing-office is the building or portion of the building employed at work in printing, with all of its appurtenances, or it is the machinery, tools and stock therein contained. The workmen in a particular place, following an old English usage, are frequently spoken of as a Chapel, which see.

Printing-offices are usually divided into four portions, the composing-room, pressroom, counting-room and warehouse. It may also have attached to it a stereotype or electrotype foundry, newspaper offices and folding-room. Binderies, engraving and photo-engraving departments, lithographic rooms and stationery and bookselling departments are frequently connected with the printing-office, and may be indispensable to a particular establishment, but they are not parts of it. They are other occupations carried on in or near the same building. The composing-room in an office of any size is usually on the top floor of the structure which contains it. The most approved form is that in which the cases can be placed around the sides of the room, the stones being in the centre. If built for a printer this room should never be less than ten feet high, the windows ascending to the top but not going down to the floor. They should also be wide. If the room is large there should be skylights in the centre; and if very large these skylights should be so contrived that light may be thrown into the centre of the lower floors. If there is much composition and comparatively little presswork two or three floors may be assigned to the compositors and one to the pressroom; but if the contrary is the case the pressrooms should have several floors. It is not well to place a few compositors in a pressroom, or a press or two in a composing-room. Where the size of the composing-room can be determined apart from the exigencies of the pressmen a room twenty-five feet wide is as good as any; but a pressroom should be at least thirty-six feet wide. This gives two rows of presses, each with its end towards a window. Much care should be taken to have a strong building, the floor of which can sustain all of the weight likely to be placed upon it. It is injudicious to pile great heaps of lithographic stones, of type-cases, of papered-up matter or of paper upon each other on upper floors. This should be done on the lower or basement floor, if at all. If composition is divided between two or more rooms it is better to have it separated by class of work and material than by any other way, an assistant foreman being provided for each room. The pressroom is usually on the lowest floor, as it is more convenient to put in the presses there and easier to handle the paper. Besides, the vibration is less. Underneath the pressroom are usually to be found the vaults or places for storing plates. Here also can be placed papered-up matter which is to be kept for a long time, and if the room is dry some of the paper can be placed there. To make the vaults valuable they should be divided from the remainder of the basement by brick walls and iron doors, and it would be better to have them entirely arched over with brick. The counting-room should be convenient and accessible. Many offices lose much work because they will not provide a convenient place for customers, who will not climb long flights of stairs nor attempt to pass through dark corridors. If the office is at all large the counting-room should be divided into two parts, one for a private office and the other for the general work of the bookkeeper and clerks and other assistants. Everything about the establishment should be known there, and in addition to the books of accounts, strictly so called, it is desirable to have other books kept which shall show other details, as, for instance, the supply of paper, the contents of the stereotype vaults and the state of delivery of printed work. For much of this labor women can conveniently be employed.

The warehouse contains the paper as it comes from the mill and the printed sheets after they leave the pressroom and before they reach the bindery. If the establishment does book publishing the books not to be immediately delivered are also stored here. Here the sheets are hung up to dry, and here are the standing-presses. The sheets are dried and pressed and then delivered to the bindery. If they are to be kept a long time, or even over a week, they are neatly tied up with a heavy wrapper around them and put away. It is better, of course, to have them folded. The heavy deliveries come through this department, except on bound work, which is taken care of by the bindery. System and care are requisite in every case.

It is a necessity in the management of a printing-office that every item of cost shall be known and estimated. Nothing is too small and insignificant for this purpose. Labor and materials used are never omitted by any employer, but a multitude of little expenses are. At the end of each year all of the expenses for whatever purpose should be added together, including a fair amount for the services of the proprietor or proprietors, and the receipts should also be taken. The latter may be unduly low from losses, or they may be small because collections have not been made. In the former case the business should not be adjudged to have been unsuccessful simply because one or two failures have occurred. When an inquiry has been made with diligence as to the standing of a customer, and the best authorities have replied that he is worthy of credit, the printer is not to be severely blamed because in some cases of this kind the information is worthless. If, however, he has more to collect at the end of one year, in proportion to the volume of business done, than at the end of the preceding year it shows wrong management. The amount outstanding never ought to exceed two months' receipts. The expenses of all kinds, including deterioration, placed in conjunction with the sums which ought to be drawn out by the proprietor, should be reckoned and then an allowance made for profit, including interest on the capital with which the business is conducted. This allowance for profit ought not to be less than 15 per cent., and the least possible sum upon which business can be conducted would be 10 per cent. Thus, if a printing-office has $20,000 capital and does $40,000 worth of work its expenses of all kinds ought not to be over $35,000. The uncertainty and variableness of the occupation demand an average return at least as high as this in order to make up for losses in some years and the constant need of renovation and improvement. Every employing printer should make himself familiar with paper and ink, knowing what they cost and how they can be used. He should also familiarize himself with the exact performance of his presses, so that he may not be misled in estimating. Every little detail must be watched, and nothing taken for granted. If the printing-office is not large the proofs in page form should be looked over by him more or less, and he should always see proofs of title-pages and important matters. It is important to know how the work is progressing, and what are the capacities of the older and more valuable workmen. Nothing should ever be decided from caprice, but according to rule. Rules, however, as to misconduct can frequently be made too severe, and it is wiser sometimes to overlook a fault than to punish it. As a rule the foremen are held responsible for their men, and must not be interfered with. Yet this government should be under the control of the house.

Branch printing-offices, generally speaking, are unprofitable. To render the trade remunerative the master's eye should be upon the work, and this cannot be done in two places at once. There can be no objection, however, to offices for the collection and delivery of work. Opinions among printers are divided as to the expediency of employing canvassers. They are tempted to cut down prices in order to get work, and there is, therefore, a double expense on all jobs thus procured, first for commissions and second on reduced prices. When canvassers are thus employed 10 per cent. is the usual amount paid, 15 being the highest. The canvasser does not receive his commission until the work is paid for. See, on the general theory of the conduct of a printing-office, COST OF PRODUCTION.

Probebogen (Ger.).—Proof-sheet.

Process Printing or Engraving.—A method by which engravings are made by the aid of photography. Until about twenty years ago no work of this kind was done commercially, although several methods had long been known to scientific men, and a few plates from which impressions were taken had been prepared. Since then photo-mechanical processes of many kinds have been discovered, the procedures have been improved and a great demand has grown up. All of them are cheaper than good wood or copperplate engraving. The first to attempt this class of work was Nicéphore Niepce, who some time prior to 1827 succeeded in producing etched metallic plates, using the bitumen of Judea as his resist. This substance is rendered insoluble by light, and by coating metallic plates with it, exposing them in the camera and fixing with oil of lavender, Niepce obtained a reversed picture in bitumen on metal. That is, where the high lights fell on the plate the bitumen remained, having been rendered insoluble in the oil of lavender by the action of the light. Where the shadows fell the bitumen retained its solubility and was washed away. On applying an etching agent the unprotected metal was attacked and dissolved, and the positive picture was corroded into the surface as in ordinary etching. On cleaning the plate it could be used for printing in the same manner as a plate etched in the usual way from a drawing in wax made by hand. The pictures were called heliographs. Niepce's process was not a success, as the pictures were indistinct and deficient in sharpness, and nothing further was accomplished in the art of photography until 1839, when Daguerre announced his great discovery of the daguerrotype.

It is impossible to give a correct and detailed description of the various photo-engraving processes. In general terms, however, it may be said that they depend upon the difference in sensibility of portions of the substances used as the plate or covering for the plate depending upon the light. In nearly all of the materials the light portions are hardened, while the darker portions remain soft. If, as in several processes, the plate is covered with water, the soft parts swell and are high. The light parts do not swell and are low, compared with the remainder of the plate. Thus, when an electrotype is made the low parts, which are the blacks, are the highest, and the high parts, which are the whites, are the lowest. The chief substances used are bitumen, gelatine, chromatized gelatine, albumen and gum arabic.

It is possible by taking choice of these processes to make plates for relief printing or to be treated as copperplate. The latter method is commonly known as photogravure. The lines are etched into the surface; but more work is done by the various relief processes. The defects of all of them are that the lines are indistinct and the elevation above the rest of the plate is very slight. To increase this many expedients are resorted to so that the contrast may be as great as possible. In all photo-engraving the negatives are touched up more or less. The high lights are rendered still more bright by white chalk or other substances, and the black parts are darkened and made more emphatic by pencil or pen. In some cases parts are rubbed out. Similarly, when the plate is made it is manipulated in order to remedy any defect. In etchings the graver is used to supplement the action of the light.

The various processes are classified by Professor Chandler thus:

1. Those in which the picture is molded in gelatine colored by a pigment, as the Woodburytype or photoglyph. 2. Those in which the picture is printed in printing-ink. (A) Collotype processes (lichtdruck, phototype), in which the picture is printed from a gelatine surface, as albertype, artotype, indotint or autoglyph, heliotype and leimtype. (B) Processes in which the picture is printed from stone, as photo-lithograph, photo-caustic and ink-photo. (C) Processes in which the picture is printed from a metallic relief surface—"typographic or block printing," as *a*, swelled gelatine processes. 1*a*, Photo-electrotype (copper); 2*a*, photo-engraving (type metal). Photo-etchings, *b*: 1*b*, Photo-zincograph (by transfer); 2*b*, zincotype (direct photo on plate with albumen or bitumen); 3*b*, typogravure (copper); 4*b*, chromo-typogravure (several plates). (D) Processes in which the picture is printed from an intaglio copperplate, as photogravure, photo-aquatint and Goupil gravure.

The first necessity in photo-engraving is a good negative. If the original is a drawing or painting a negative must be made from this so that the type picture shall be a positive; but it is very generally a photograph made from a negative, and that again from nature. Most pictures in photo-engraving are executed by the wet collodion process. Such negatives must be well made in every respect or the engraving will be a failure.

Many methods are known in photo-engraving. That which is most used in newspapers and for outline work is known as zinc etching. Other metals are used; but from the fact that zinc is chiefly employed they are all generally known by this name. Drawings are made, generally speaking, of about twice the length and breadth of the cut desired and photographed upon the plate. The paper should be pure white to obtain the best results, and the drawing is done in black ink. The zinc must be pure and of a good quality. In thickness it is from one-sixteenth to one-fourteenth of an inch. After being cut into pieces of the desired size it should be polished with pumice-stone, finishing with willow charcoal and olive-oil, buff and rouge. The finer the polish the better the plate. The zinc is then sensitized by covering it with a solution made of bichromate of potash, distilled water and the white of an egg beaten to a froth. This is poured several times over the plate, which is slanting. It is then dried over a gas or oil stove. Some etchers grain the surface at this time, but some before the sensitizing solution is employed. For this a bath consisting of one quart of water, one dram of nitric acid and one ounce of saturated solution of zinc is employed. In four or five minutes it will become gray and acquire a very fine tooth or grain. The sensitizing is done in a dark room, and the zinc is then placed in a printing-frame. The negative being in the frame, film side up, the coated zinc is placed upon it, face down, judging the proper position. The zinc is laid flat down upon the negative, and a piece of brown paper is put over the back of the zinc. The back of the printing-frame is then secured in its proper position, the crossbars are fastened down, and the pressure-screws are applied evenly and gently. Care must be taken to remove all dust or grit, as a very small particle will break the glass. Even pressure being applied, exposure to sunlight or other light from two to eight minutes, as may be required, for the former, but from six to thirty minutes in the latter, follows. The plate is inked with printer's or lithographic ink until it is covered evenly but thinly. It is then taken from the dark room, where this operation has been performed, and laid face upwards in a shallow tray with enough water barely to cover its surface. After about five minutes a piece of clean cotton is rubbed against the surface with an easy circular motion. The engraving then appears in the form of black lines against a bright background. The plate is washed thoroughly in running water, the surplus water being taken up with a damp cloth, and it is then heated over a stove to a degree not hotter than the hand can comfortably bear. Should any lines be imperfect they can be touched up with printer's ink thinned with turpentine and applied with a fine brush. Blank spaces of great size should also be painted in, thus saving much manipulation.

The surface of the plate showing the picture, but still being flat, is next covered with dragon's blood triturated to an impalpable powder. This protects the lines of the engraving when the plate is placed in the acid bath, where all the parts not so protected are eaten away, the lines being left in relief. It is carefully brushed over the surface, and when properly executed the drawing is seen to be of a reddish-brown color against a perfectly clean background of polished metal. The plate is then put into an oven, the powder melting and combining with the ink. As soon as this is done, which can be known by the drawing being of a bright, deep brown instead of a dull red, the plate should be removed. The back and edges of the plate are painted with asphalt varnish to prevent the acid from attacking the zinc in these parts. The plate is then heated slightly to expel the turpentine from the varnish. When cool it will be ready for etching. This is performed in a little etching tub or box 20 by 24 inches. Nitric acid and water constitute the solution. The tub should be rocked so as to make sure that the whole plate is equally affected. A grayish deposit, which can be removed by a brush while the rocking continues, soon forms. If any fine lines show signs of giving way the plate must be taken out, washed and retouched, or even gummed, inked, dried and repowdered as at first. If nothing of this kind is discovered the etching ceases in eight or ten minutes, the eating away being very slight. The lines are again inked and powdered and the plate is heated, another bath being then given with a stronger solution. This is repeated according to the work, the number of etchings being from three to eight. Touching up may be requisite at any stage. The plate is then routed and finished.

Printing with asphalt differs somewhat from printing with albumen. One ounce of pure asphalt is mixed with fifteen ounces of benzole. The coating is flowed over the plate in the dark room, the plate being afterwards slightly warmed so as to drive off all the benzole. The printing is executed in the same way as with albumen, but takes much longer. It requires from fifteen minutes in sunlight to two or three hours in diffused light. Rectified turpentine is poured into a shallow porcelain or glass dish to the depth of about a quarter of an inch, and then the exposed plate is laid in it. The tray is rocked gently, when the print will gradually make its appearance. When completely developed the entire plate will appear as if covered with a scum. It is then placed in a bath of benzine. This removes the remaining turpentine and leaves a clear, sharp print. After washing and drying the plate is exposed to sunlight for ten or fifteen minutes, which hardens the asphalt. The other processes are much like those with albumen, except that gumming up is practiced, as is also sometimes done with that. Gum arabic is employed after the first etching, to prevent the lines from being under-eaten.

Half-tone plates are made by passing the rays of light from a negative through a screen which is ruled or dotted. A photograph, although a perfect picture, cannot be printed in the typographic way, for there is no relief to the black portions, and the white parts are just as high as any of the remainder of the plate. The printing-plate must have these parts broken up in some method so that the light spots show very little and the black parts very fully. This is accomplished very thoroughly by screens, generally of glass, upon which have been printed by photography the kind of ruling or dotting desired. Pictures to be copied in half tone should be rich in contrast and full of detail. The closer the lines are together the finer will be the engraving, but also the more difficult to print. Sometimes lines as coarse as eighty to the inch are made, but generally speaking one hundred and thirty or forty are required. The screens are generally crossed by other screens or turned around after one exposure for a second one, so that the lines shall intersect. With a half-tone it is impracticable in zinc etching to powder the surface several times. The acid used is in a very diluted form. Very great care is required to make good half-tones.

Gelatine processes are slower and more difficult to carry out than those on zinc or copper. The substance is brittle when dry, and is easily affected by atmospheric conditions. Plates made by it take a long time to finish. By the washout process a sheet of sensitized gelatine is exposed beneath a suitable negative. The soluble portions are afterwards washed away, giving a relief plate. The gelatine used has been previously rotted, so that as soon as the exposure is made the parts not needed can be washed out. The swelled gelatine process is that by which the film is soaked in cold water until those portions representing the whites of the original have absorbed the liquid, the lines not swelling on account of the light having deprived them of the power of absorbing water. From this a plaster of paris cast is made, and from that again a wax mold, necessary for the production of an electrotype. Both the washout and swelled gelatine processes require much manipulation, and neither is commercially of the same value as the zinc processes.

In the collotype reproductions from nature can be made without a drawing or a screen. The actinic rays act directly upon a prepared gelatine, which swells or remains fixed according to the degree of light. The film of gelatine takes ink from the roller exactly in proportion to the amount of action of light during such exposure. Great skill is necessary on the part of the pressman.

For further information upon this subject see Schraubstädter's Photo-Engraving and Wilkinson's Photo-Engraving, and in this Dictionary under the heads ALBERTYPE, ARTOTYPES, CHROMO, CHROMO-LITHOGRAPHY, CHROMO-TYPOGRAVURES, COLLOTYPES, GOUPIL GRAVURES, HELIOTYPE, INDOTINT, LEIMTYPES, PHOTO-AQUATINT, PHOTO-CAUSTIC, PHOTO-ELECTROTYPE, PHOTO-ENGRAVING, PHOTO-LITHOGRAPH, PHOTO-ZINCOGRAPH, TYPOGRAVURE, WOODBURYTYPE, ZINCOTYPE.

Profit Sharing.—This is the term usually employed to denote the division of a portion of the profits of an establishment among the workmen, although they have no proprietary rights. It is believed by some persons that this will increase the production of a shop or factory, bring the employer into closer relation with his hands and lessen the friction between organized labor and capital. Under certain conditions and in certain industries this is no doubt true; but it may be questioned whether it is a general remedy or not.

At a meeting of the New York Typothetæ some years ago this plan was discussed on both sides with much ability. One firm then reported that it had tried it advantageously; but it has since been abandoned in its office. Another firm has since attempted it under the most favorable conditions. It has not yet ceased its division, but the increased production, care, economy and foresight predicted have not been attained. So small is the gain in this way that it is almost imperceptible.

Prolongado (Sp.).—Oblong; said of a sheet when folded the long way.

Proof.—The correctness of a book is, as a French writer somewhat fancifully expresses it, its soul. No pains or care elsewhere, no elegance of material can make up for deficiency in this respect. To read well adds much to the expense of a work, but it is a necessity for any one who desires to obtain or maintain a position as a good employing printer. The responsibility cannot be thrown off on authors, editors or customers, for they have not the necessary skill. To obtain it recourse must be had to the reading-closet, and to persons professionally trained to detect and mark errors.

The business of a proof-reader is of four kinds. He must collect and arrange the copy which the compositor has set; he must read and revise it as many times as shall be necessary; he must put away this copy so that it can be referred to as long as the work is in progress, and he must finally bundle it up and put it away, either for preservation for some considerable time, for return to the author or for destruction. Different usages exist about each of these details in different offices, and those customs only will be here stated which may be regarded as good. If others are mentioned the reasons for dissent will be given. When a new work has been placed in hand, with five or six men at work upon it, the probability is that there will be no proof before the second day, as if the takes are somewhere near a galley long, and perhaps have from four to six thousand ems in each, and the cases must be put up and letter distributed, the succession of three or four galleys will not come about at once. Even if the takes are only three or four stickfuls in length, and eight or ten men are working upon the matter, it cannot be expected that a great deal will be ready on the first day. Almost all work done in the United States is proved upon the galley, the practice which existed before the war of imposing and then proving having died out. No attention will consequently be paid to the latter method in this place, as it is a great loss to the compositor and no advantage to the office. Twice or three times as much stone room must be provided, and much more type will be injured in correcting. When the proof is taken, which is generally upon a proof-press, but occasionally with a planer or a proof-brush, and sometimes upon a hand-press, and it has gone into the proof-room, the sheets which have been composed must also be collected and taken there. All foremen do not keep a schedule, as they should, showing where copy has been placed. If they had such a record it would only be necessary to look at it to tell which men had takes, and then by going to them the sheets could be picked up very quickly. Perhaps as good a plan as any is to have each man as he completes his take go up to the foreman's desk with it, laying it down in a certain definite place, and then ask for more copy. Some men, however, will delay this return until they want more copy, and the take will lie on their case while they are distributing or perhaps while they have a half day off. It is therefore valuable on this account, if for no other, to keep a schedule of the work in hand, with the name of the compositors working. The copy being taken into the reading-closet and placed in order by the copy-holder, it is at once seen whether a take is missing, and if so the man who has retained it can very easily be found. The proof ought to be on good book-paper, with a reasonably wide margin on both sides; if there is reason to suppose that it will be a bad proof an extra margin should be allowed. The paper is slightly damped. No pains should be spared to secure a good proof, for upon that depends the detection of many of the errors. The roller should be in first-rate condition, and the ink, without being stiff, should be well triturated and ought to be well distributed. Care must be taken in lifting the proof from the type, as a too quick movement will sometimes leave particles of paper in many places. Finally the galley must be washed. This would not have been mentioned, as it is a matter of course, had not a very eminent French printer lately directed that the ink on forms which had been repeatedly proved for fastidious authors was sometimes caked in and must be washed off. They not only ought to be washed then, but every time that a proof is taken, except, of course, when a number of proofs are to be pulled one after another.

The copy-holder, having found all his sheets and the proof which relates to them, puts them together and waits until the reader is at liberty. The reader, having completed the work upon which he was engaged while the copy-holder is preparing the new proofs, takes up this first galley of a new work and begins, after casting a hurried glance down the matter to see what it is like. The copy-holder, who sits near him—so near that by bending over the proof-reader can look at a doubtful word, or at least so near that he can take the sheet out of his hand—begins reading aloud at a moderate rate of speed and continues doing so until the galley is finished. When the proof-reader says "Hold" he stops; when he says "Go on" he does so; when he is told "Read that again," or "Read the last two lines again," he does so. He does not read rhetorically, but rather like a machine, without emphasis and without discrimination. If well trained he spells out each proper name which has two or more orthographies, as Douglas and Douglass, Rathbun or Rathbone, Whitley or Whiteley. The same thing is observed with all foreign words and all geographical names, as well as with all words which are very uncommon, such as "rathe," "pinguid," "cecity," "brachycephalous." On each of these, when there is any room for doubt, the proof-reader will himself look so as to make certain that he is making no mistake. The boy should repeat ambiguous or doubtful sentences, or those in which there are many interlineations and alterations. Occasionally in a knotty bit of copy he should, after once going over it, hand it to his principal, who will follow it for a few lines or even a page to make sure. There comes occasionally into a printing-office some copy which must be followed exactly, but to do this requires that all of the punctuation marks shall be read as well as the text. A joke which appeared in the papers at the time this article was written would thus be read:

> But cap They cap Grind cap Exceeding cap Fine cap period dash commence quote Poor cap fellow exclamation But cap why did you reject him in such a summary way interrogation close quote commence quote Well cap comma he apostrophe s the editor of that Moonshine cap italic Magazine cap italic comma and rejected one of my poems once period I cap just thought I cap apostrophe d let him know that two can play at that game period close quote dash Life italic period.

This would be comparatively easy to some of the dialect stories, in which the humor is all in the dialect, or some abstruse calculations. It is related in a biography of an English journeyman printer that to secure accuracy in a Welsh book printed in London two women compared it letter by letter with the original, neither knowing a word of Welsh, and it is certain that some of the early printers adopted this plan to make their classical editions still more accurate. The reader should accompany the boy as closely as possible, his eye being at the place in the copy when the last word was read. If the work is not one of unusual dispatch it is common to read two or three galleys on the same work before sending any out, and this plan would almost certainly be adopted on the first part of a new work. After this is finished, while the boy is gathering up his next batch of proof or perhaps endeavoring to decipher it before he attempts to read it aloud, the proof-reader is looking at the details of the proof which he could not examine when he was keeping even with the boy. The proof-reader does not originate style; he follows that of the office. Sometimes with the first sheet of a work he has directions what rules to follow. This work follows Webster, that Worcester, a third must be closely punctuated, a fourth must be followed strictly as to punctuation, and a fifth leaves all of these questions to the proof-reader. Each of the dictionaries differs as to spelling and division, and if one is to be followed it must be frequently consulted. Often a new word will appear not yet in the dictionary. Sometimes there will be an old one or a provincial expression like the Scotch word blate or the Southern word fice. This constant examination of authorities consumes much time; but there are other things for which the proof-reader must look out, where the compositor is continually trying to evade his watchfulness. Three divisions one after the other; pigeonholes or staircases, occasioned by too great spacing or spaces forming regular steps up and down; a lack of uniformity in capitalizing; bad spacing; punctuation too close or not close enough—these are some of the things for which a proof-reader must look. The ordinary compositor in setting type makes an error in every one or two hundred letters which he sets, but discovers a portion of them before he empties his stick. Some men will not make more than one error in three or four thousand letters, but all make some. The proof-reader in going over their work may in one reading take 90 per cent. of these errors; he may possibly run as high as 99 per cent.; but he cannot discover them all. This shows the advantage of repeated readings, the errors becoming less by each successive examination. The work of the first reader must some time come to a close; he has marked at the beginning of each take the name of the compositor who set it; at the head of the galley he has marked "1st," and at the foot his own initials. The boy then takes it out and gives it to the first man who has an error.

Crapelet in his very interesting and suggestive work speaks about two other methods of reading, to which might be added a third. One is to read by the thumb; that is, to collate the proof with the copy, following the latter with the thumb. This is sometimes necessary in algebra, music and in work in foreign languages, and it has been known to be used with success on other works; but it is very slow and trying, and it costs an office more than the other way. Further on some cases will be mentioned where it ought to be used as a supplement to the other reading, but in general it is too tedious. Another plan is to have the proof-reader occasionally read to the copy-holder. This is also defective, as the boy will sometimes lose his place; but on daily newspapers, where the copy-holder is as good a reader as the other man, it works well. Greater speed and less fatigue are thus attained. The third plan is that which nearly all authors have to adopt, and which is the plan of all editors. The proof is read silently with occasional references to copy, there being no copy-holder. Many errors can thus be weeded out, but there is great danger of mistakes in proper names and also of outs and doublets. In reading much depends upon the copy-holder. If a boy he needs two or three years' practice to make him as efficient as he ought to be, but in the meantime he is growing up and desires some more lucrative position than that of copy-boy. Another lad must be taken on. The experience of New York has lately been that young women make very good copy-holders. They are quick and active, soon learn to read well and are content to stay in the occupation. Experienced girls should be paid a little more than one-half the wages of a journeyman. Thus in New York ten dollars a week will secure one with much practice. Boys are worth five, six or seven.

This proof, known as the first proof, now goes out to the compositor who set it, or to the first one on the galley who has an error. When the compositor's work is done a revise is taken which is sent to the author, and another is kept for the office. That which is sent to the author is marked "A. P.," with date and hour, so that there can be no doubt as to the time when it was sent to him. Before this is done, however, it is carefully compared with the first proof, and any errors which may have escaped correction, as well as all of the new errors made by the compositor, are indicated. Any other mistakes which may be seen in going hastily over it are also marked. These are copied on the office revise, and then, and not until then, should the date line be added. The errand-boy should be immediately dispatched with it if the author is in town, and if not it should at once be sent by mail, the copy accompanying it. Some readers then finish their revise so far as they can, while others wait until the proof from the author comes back with the copy, and then proceed with their further work. It cannot really be completed without the copy; but on the other hand there may be much slack time before its return, and there might be a very busy time when it does return. The reader of the second proof begins at its beginning and reads it carefully all the way through. The errors found in the first proof are obvious. Points of doubtful decision in capitalizing, in spelling, in punctuation are deferred to the second reading. It must be laid down as a canon that the author and not the compositor or proof-reader is responsible for the wording of the book and its facts; yet all authors, however accomplished, fall into errors, even on subjects with which they are thoroughly familiar, and nearly all of them would feel obliged to a proof-reader who points them out. It is easy to write Henry VII. when Henry VIII. is meant; to make a false addition in a table; to say Concord, Mass., when Concord, N. H., is intended; to fix the date of the American treaty with France in 1776 instead of 1777, or to say that Abram S. Hewitt was the nephew of Peter Cooper when he was in reality the son-in-law. These things and others like them the proof-reader should query, either with or without the true answer. He must decide no ticklish points in grammar, but plain cases of the disagreement of the verb and its nominative may be changed without reference. The author may use old, common or vulgar phrases, but these cannot be corrected by the reader. Lengthy may shock him, or talented or reliable; he may think big or got or whaling, in the sense of punishment, undignified. These however are questions for the author, and not for him. His business is to weed out errors and not to write the book or pamphlet. The punctuation should follow the usual rule of the office, as few authors know much on this subject. If they think they do, however, they should be followed. The same remark applies to capitalizing. A mark once made by an author for a word to be capitalized in a certain position should result in having that word always capitalized in the like place. Hyphens used for compounds ought to follow the same rule. If the author wants them hyphenized freely it ought to be done; if he does not, but strikes them out, the work should be consistent as far as possible. Yet if an inconsistency does exist the proof-reader should not take it to heart. This must often be. Among things which should be looked at after the proof is gone over, every doubtful sentence, every proper name and every figure having been compared, an examination should be made of several things which might easily escape notice, as, for instance, a lead left out or two leads inserted in one place; the regularity of spacing, the sequence of divisions and their correctness, and the regular order of a number of figures or letters which were intended to follow each other. Quotations from the Bible and Shakespeare should be verified. Before the second proof is taken the place where the compositor left off on his copy should be marked on that page as ▁▁▁▁▁▁┌▔▔▔▔▔, the perpendicular bar being the end of the one and the beginning of the next. After it should be written on the text "Galley 2," and so on through the entire work. The proof after it has been completed goes out to be corrected, and is then made up in book form. A mark similar to that given previously comes where the last page of type ends, and the galley which had it has the word on the margin "Sig. 2."

Under ordinary circumstances the proof is now supposed to be finished, except for the detection of errors occasioned by the make-up and for the correction of those which were omitted. In some offices a revise is sent to the author marked "A. R. P.," with date and hour. It is the better custom to do so. There is also a revise for the office. This is read at once and the errors are noted. In reading a revise more ought to be looked at than just the error which has been committed. That may be uncorrected, while the very same word a line or two above or below has been changed. An out or a doublet ought to be read from the top to the bottom of the matter which has been run over. The folios ought to be read successively, as well as the head-lines, and the signature calculated to see if it is right for the page where it appears. For instance, signature 17 must come in a sixteen on page 256 plus one, or 257. Every line in capitals, small capitals or Italic ought to be read carefully over in addition to all of the other readings. When this is completed and the author's corrections have been consolidated with them a press revise is taken, at which the reader looks only to see if those already marked have been corrected. On this proof he writes "Press" and the date, and it is then ready to be printed. When the work is printed the first sheet goes, after it has been folded by the pressman, to the foreman, who looks at it for a moment, and if it seems to be right gives the order to go on. If the foreman is an experienced man with a good eye he can form a very good idea of how the proof is, and a hasty look at the folios, the signature, the titles and so forth sometimes prevents an astonishing blunder being made. On some neat work this proof is read for bad letters in order to make the impression better. Much depends upon the co-operation of the author in regard to making a book free from errors, where no more is done by the office than in the programme laid down. This is entirely sufficient for reprint and it passes in manuscript, and such reading as is mentioned here will cost at least ten cents a thousand in New York, Chicago or Philadelphia, and may cost more. The author, however, should interest himself to prevent mistakes. It is his book, and if he has had experience in bookmaking he ought to winnow out a very large percentage of errors.

The most difficult works require still more care than is here laid down. Such works as dictionaries will immediately occur to every one; but there is a great list of smaller books which require the utmost care, and some of them must proceed with considerable speed. Leslie Stephen's Dictionary of English Biography would not occur to most scholars as requiring extra pains. Yet three thousand pages of this are prepared in a year with close resemblance in style and with very many difficult passages. In very few cases will two articles, except concerning persons in the same family, be in the same handwriting and follow each other. There are extracts in a dozen languages. In such a work as this, instead of sending out an author's proof as soon as the first proof is corrected, it is read again by copy and corrected, then read by the editor and one or two of his assistants, and then sent out. A revise would be sent in every case where there were any considerable number of changes. After this returns a couple of the editors will each read it again, and then the chief proof-reader will try it for the last time. This does not exclude a page-proof from the electrotype for bad letters and so on. Generally speaking, an electrotype is more accurate than type, for there is no chance of letters dropping out at the end of lines. In Webster's Dictionary of 1859 proof was sent out to a dozen different persons, who each read it, and it is understood that the Century Dictionary received more than forty readings. Works of this kind ought to be read at least twice by copy in the printing-office, and should as well receive one reading besides, and no work of erudition should go out which has not been read twice or thrice in addition. It is frequent for publishers to get an expert to sit in their office and read proof for them, the printing-office having nothing to do with him. On these large works an abundance of type must be provided, certainly enough to keep the hands employed on them going for two or three months. Somebody is sure to delay, and some one is certain to keep his copy back until the last moment. On much work, but not on this, it is well for the proof-reader to dispense with his copy-holder on one reading and to collate the text with the print. This ought always to be done in poetry, where any far-fetched word, if it is not prosaic, is allowed, and as a consequence a very large vocabulary is used. Many of these words sound like others and can easily be mistaken for them.

In reading foreign languages it must not be forgotten that their rules are different from ours. Some of them we disregard, as the way the French have with quotations, and in regard to the use of spaces before punctuation marks, as well as compounding proper names; but there are other rules which are invariable. A good office in a city ought always to have accents, and they should be put properly in their places. Frequently they mark a wide distinction of meaning. In French, a without an accent means *has;* but with one, *to*. The punctuation in French is entirely dependent upon grammatical connection, and does not follow sound as much as in English. When taking up this language, or any of the common tongues of Western Europe, the copy-holder should pronounce the words in the way most natural to him, as he understands no foreign tongue, giving its words the English sounds. This secures the reader against outs and doublets. After this reading is done the corrector must then go over it by himself before the compositor gets it. If the copy is all in manuscript very little can be done with it even by the proof-reader, unless he understands the language. Casual French and German words should be looked up in the dictionaries to see whether they are spelled right and whether the accents are right. It does not always follow that the copy is incorrect when the accents are placed differently from the position given in the book. All languages are in a state of change, and French no less than others. There is, too, an old orthography in French, German, Dutch and other languages. Sous was once soubs, semaine was once sepmaine, and être estre. Bei in present German was once bey, and Waldow spells theil, a part, as teil. Dutch orthography was changed at the beginning of the present century. Latin, Greek and other dead languages; Polish, Bohemian, Welsh, Basque and other European languages not closely related to Latin or English; and the tongues of the East, such as Arabic, Persian, Sanskrit and Hebrew, must be followed, for it is rarely indeed that the proof-reader or compositor knows enough about any of these to lend any correctness to the work. The proof must depend upon the editor.

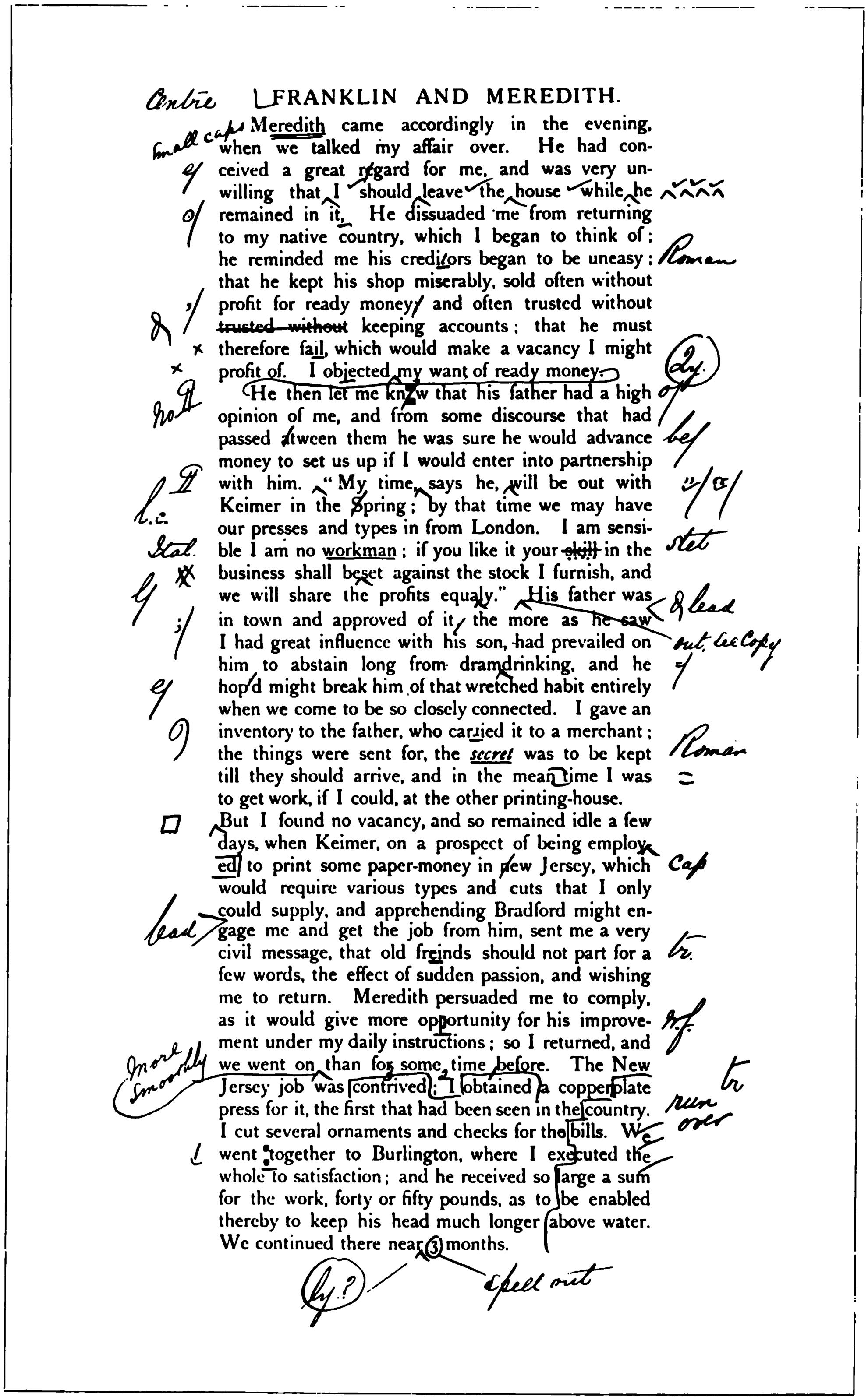
Correcting in the form as above mentioned was formerly much practiced in America, and is still the common method of British book offices. The matter is set up as usual. The compositor who has the first take gets his gauge from the foreman, as well as his instructions about sinking the first head, style for folios and amount of spacing out, and then proceeds to make up as far as he goes. He passes the make-up to the next man, who gets his pages ready, when he in turn passes to the third man. The last man who makes up imposes the form and proves it, or in a large office gives it to a certain man who is charged with this duty. After the sheet has been read the workman who has the first error marked takes up the form, places it on the stone, unlocks it, corrects his portion, and then calls the next man. This proceeds until it reaches the last man who has an error. When his corrections are completed he locks up the form and it is again proved, when the same process is repeated. To facilitate his work he either sets up his corrections in a stick, or he brings over his case to the stone, laying it upon the top of a stool. This antiquated and awkward way should be at once abolished in any office where it exists. Its advantages are that fewer brass galleys are required, which would be necessary if galleys were to be proved; the author and counting-room can see a proof in the form in which the work will finally be, and there is some danger of error in transposing matter from galleys to the form when it is not afterwards read by copy. The first two objections are trivial; to scrutinize the proof again, as might be required with the third, might take from a quarter to half an hour on a full octavo form. The battering of type by tweezers and bodkins is very great when corrections are made in the form. The loss of time to compositors is immense. More than one-tenth of their time is passed at the stone. It is, besides, very exhausting.

Newspaper Reading.—In a newspaper the problems are very different from those in a book office. Here expedition must be the chief point. Proof-readers are rarely chosen for these places unless they are good, practical printers, with much reading in English, quick eyes and a good understanding of manuscript. Their proofs follow one invariable rule as to style, from which they are not at liberty to vary. What is capitalized to-day must be capitalized to-morrow. As a consequence there is a consistency and a regularity about them in this respect which many book offices would be glad to equal. A dictionary is given them as a model for spelling and division, from which they are not allowed to deviate, and in compounding they follow a uniform rule. Proof is read only once on daily papers, and is then revised. Both the reader and copy-holder are men, and both are supposed to be expert readers. They take turns in holding copy, except in some few cases, changing about with each galley. The one who holds the proof reads aloud to the copy-holder, unless it is supposed to be something on which extra care is required. This relieves each man from the great strain on his voice which reading for several hours would occasion. Proofs are taken up from the table in rotation on ordinary news matter. It is supposed that four proof-readers and a reviser can read for thirty-two men.

Job Printing.—Reading in this kind of work must be very careful, but it does not require the education needed for either of the others. The reader should be quick to detect wrong fonts, bad letters, false spacing and errors in style. He should also be able to mark wrong lines and wrong methods, and to point out how changes should be made. For these reasons he should be an expert job printer. Where a number of men are working on miscellaneous jobs it would be strange indeed if some of them did not mistake a line or commit an error in getting up a card or programme, or that some change would not brighten up a given job very much.

Proof-readers need to be careful and considerate in their dealings with compositors and with authors, the latter being very irritable and the former frequently making mistakes which they would not have made if they could have had the entire copy before them. They should never indulge in spirituous liquors in anticipation of or during their tour of duty. Their studies should have been the same as those of the compositor, but they should also acquire a very careful knowledge of grammar, punctuation and orthography. Much current reading is indispensable. It is well to know French, German, Latin and Greek, but these are not necessary. Less and less work is done in dead languages, and for the commoner foreign languages compositors and proof-readers can be engaged. A knowledge of history, biography and geography is very valuable. The closet should be well stocked with books of reference. An English dictionary, one of French and one of German; a cyclopædia, a dictionary of biography and one of geography ought all to be there. In English, Webster's and Worcester's seem to be nearly equally good, and the Century Dictionary is now ready for use. If more English dictionaries are obtained, Latham's Todd's Johnson is very valuable, as is Richardson's, which gives copious citations showing the meaning of words as they are used by the best authors. The New English Dictionary, edited by Dr. Murray, while in some respects more valuable than any of these, will not be ready for a generation.

Some of the words relating to proofs may here be noticed. A first proof is that which is first read after the compositor has done his work; a second proof follows it. The latter is not always a revise. A revise is when the second proof notes and marks the errors on a first proof which have remained uncorrected, as well as marks any new mistakes which have originated during correction. In a revise, however, all other errors which have or can be found are incorporated. A proof which contains many errors is said to be foul or dirty, while one in which there are few is clean. To pull a proof is by modern usage to take it in whatever manner; but the word is gradually going out of use with the practice of taking one upon a hand-press. According to Southward in England the rectification of the errors and imperfections of composition is called correcting, and the process of examining and perusing the proof and marking the errors upon it is called reading. Hence, reading and correcting, although both applicable to the proof, have specific meanings, and for the sake of distinction it is said that type matter is corrected and the proof is read. These distinctions are not observed in America. The corrector is here generally known as a proof-reader, his work is called reading or proof-reading and his marks are corrected. The closet, thus called in England, is commonly known as the proof-room here. The mark used by many proof-readers after the marginal emendation is called the separatrix. Corrections not occasioned by an inaccuracy of the compositor, as, for instance, the substitution of one word for another, are generally indicated by a circle or ring running around the word. In some offices the compositor does not correct this, but passes the galley to the office hand, while in others he



FRANKLIN AND MEREDITH.

Meredith came accordingly in the evening, when we talked my affair over. He had conceived a great regard for me, and was very unwilling that I should leave the house while he remained in it. He dissuaded me from returning to my native country, which I began to think of; he reminded me his creditors began to be uneasy; that he kept his shop miserably, sold often without profit for ready money/ and often trusted without ~~trusted without~~ keeping accounts; that he must therefore fail, which would make a vacancy I might profit of. I objected my want of ready money.

He then let me knew that his father had a high opinion of me, and from some discourse that had passed etween them he was sure he would advance money to set us up if I would enter into partnership with him. "My time says he, will be out with Keimer in the Spring; by that time we may have our presses and types in from London. I am sensible I am no workman; if you like it your ~~skill~~ in the business shall beset against the stock I furnish, and we will share the profits equaly." His father was in town and approved of it, the more as ~~he saw~~ I had great influence with his son, had prevailed on him to abstain long from dramdrinking, and he hop'd might break him of that wretched habit entirely when we come to be so closely connected. I gave an inventory to the father, who carried it to a merchant; the things were sent for, the *secret* was to be kept till they should arrive, and in the mean time I was to get work, if I could, at the other printing-house. But I found no vacancy, and so remained idle a few days, when Keimer, on a prospect of being employ- ed to print some paper-money in new Jersey, which would require various types and cuts that I only could supply, and apprehending Bradford might engage me and get the job from him, sent me a very civil message, that old freinds should not part for a few words, the effect of sudden passion, and wishing me to return. Meredith persuaded me to comply, as it would give more opportunity for his improvement under my daily instructions; so I returned, and we went on than for some time before. The New Jersey job was contrived; I obtained a copperplate press for it, the first that had been seen in the country. I cut several ornaments and checks for the bills. We went together to Burlington, where I executed the whole to satisfaction; and he received so large a sum for the work, forty or fifty pounds, as to be enabled thereby to keep his head much longer above water. We continued there near 3 months.

Rev.

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if I would enter into partnership with him.

"My time," says he, "will be out with Keimer
in the spring; by that time we may have our presses
and types in from London. I am sensible I am
no *workman;* if you like it your skill in the busi-
ness shall be set against the stock I furnish, and
we will share the profits equally." The proposal
was agreeable, and I consented. His father was in
town and approved of it; the more as he saw I had
great influence with his son, had prevailed on him
to abstain long from dram-drinking, and he hoped
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CORRECTED PROOF, WITH ADDITIONAL AUTHOR'S CHANGES.

corrects the change and charges the office for it. In England this mark is called the house mark, because the house or firm pays for it. To cancel is to take out of the galley or form matter which is not to be used, but is to be distributed. A double or doublet is a repetition of the same word or words. The latter expression is always used in this country. A literal is an error of a single letter, one substituted for another or turned around. A wrong font or a battered letter is also a literal. Prima is the piece of copy containing the first words of a following sheet or signature. An out is an omission of a letter, word or phrase.

The cost of proof-reading varies from 15 per cent. of the cost of composition up to 50 per cent. The lowest rate is on reprint, and the highest on manuscript. On the cheapest work one reading with a revise is thought by many printers to be enough; but on the best work three readings are adopted by some employers. This cost varies much according to the individual reader. Some readers are very much slower and more careful than others. A certain very famous proof-reader of New York, long employed by the Appletons and the Methodist Book Concern, was said to devote from twenty to thirty cents' worth of time to every thousand ems of proof he read, and yet, such was his value on some particular books, he was always in full employment. The usual remuneration of a proof-reader is slightly in advance of that of a compositor, yet a very large proportion receive no more. In a large office the head reader will receive 50 per cent. more than a compositor, and it is sometimes the case that one will have even more.

To do work with economy and profit it is of the first importance, says Theodore L. De Vinne, that the office shall have the superior control. It cannot do this if the customer is permitted to watch, direct and alter composition while it is in progress. Usage has sanctioned the furnishing of proofs, which to some extent and on some kinds of work is not only reasonable but desirable. The customer has a right to know before printing that his work is likely to be correct and satisfactory, and his revision of the proof relieves the office in some measure from responsibility. Yet at best it is a disagreeable necessity to give proofs, for it prevents system. It not only stops the work in hand, but it often delays other work by depriving it of needed material, as well as compels much extra labor in other matters. The customer should be restrained as much as possible from using a first proof as a blotter for corrections. He should be induced to rewrite badly written copy. If this is impracticable it will be of advantage to both parties to have bad copy, if not too long, carefully rewritten by the office. All practicable directions concerning the size, style, &c., should be put in writing. If displayed or table work is desired a rough draft should be made, in which the probable appearance of the work should be indicated. This draught should be submitted to and approved of by the customer before the work is given to the compositor. Every five minutes spent on such a draught may save an hour of useless composition.

For hurried work and all cheap work there should be no proofs. Copy should be made legible before it is given out. The customer should certify to the correctness of the written copy, and the office should undertake the responsibility of correctness to that copy. The office is always responsible for proper orthography of common words, and for correctness to legible copy or alterations. It is not responsible for the accuracy of any technical word or proper name, especially for the initials I and J when equivocal in the manuscript. It is not responsible for faulty grammar or rhetoric in copy. Requests to amend either should be declined or cautiously exercised. It is not responsible for errors of statement or for ambiguous directions. The printer's duty is mechanical; he should not undertake to edit the customer's work or deviate from his copy. The exercise of such a license is both thankless and unprofitable. An unanswered query of the reader in proof relieves the office from all responsibility for the queried error. A charge should be made for extra or duplicate proofs.

Sometimes proof-readers are employed in making indexes, preparing headings for pages and revising copy before it goes into the compositor's hands. These should all be charged for.

It is of great importance to authors to learn how to mark a proof correctly. Each particular class of errors has its own mark and should be carefully noted. They are generally indicated by drawing a line through the letters or words which are wrong and writing on the margin exactly opposite to them the correct words or characters. If the marks are too numerous lines are drawn from some or all of the wrong words or signs to the corrections in the margin. This is particularly necessary with figures or with copy having abstruse expressions.

When words have been left out or are to be added to the line a caret (∧) must be made in the place where they are intended to come in, and the words must be written in the margin.

When a space is wanting between two words or letters which are intended to be separated a caret must be inserted where the separation ought to be, and two parallel lines with two cross lines running through the others (#) placed on the margin. It is the mark for a sharp in music. Some proof-readers make tall, thin space-marks where they desire a thin space, and broad, thick ones where they wish wide spacing, but this is not generally followed. Where words or letters should join, but are separated, strokes are made over and under the space, touching the top and bottom of the letters at the side as in en⁐ameled. The same mark should be repeated in the margin.

When a line is badly spaced and it is desired to make the distances more equal the end is accomplished by marking with characters like a caret at the bottom of each blank where more space is required, and the same at the top, but reversed, where less space is needed. The last look much like the root mark in algebra or the tick made by a bookkeeper to indicate that a certain line or number has been examined. An example is here given of two lines, one incorrectly spaced and consequently marked, and the other showing how the matter will look after correction :

When ✓ words ∧ have ✓ been ✓ struck out ∧ that ∧ have

When words have been struck out that have

If a succession of lines appears to be badly spaced draw a line against them and in the margin write "badly spaced." If the compositor does not mend his ways call the attention of the foreman to him. It would be well for the establishment to let him go.

When letters or words are set double, or are required to be taken out for any reason, a line is drawn through the superfluous word or letter, and a mark made like an old-fashioned letter *d*, with the top of the letter curling over, made in the margin. This is an abbreviation of the word dele, take out. The correct form is shown in the proof accompanying.

Should this mark be wrongly made, and it is desired to change it back as it was before, the word stet (let it stand) is written in the margin, and underneath the letter, letters or words are placed little dots like those in a leader. Of course, the other mark on the margin is rubbed out. Many proof-readers do not use the dots.

A turned letter is noticed by making a stroke under it or through it. At the margin a mark is used which curls over upon itself, similar to the convolutions of a snail's shell.

When a space sticks up between two words it is shown on the margin by a horizontal line, above which is a perpendicular one. This perpendicular line does not cross nor does it touch the lower line.

nsertion of an em quadrat is noted by the use of (□) in the margin, while at the place where it inserted a caret is marked. En quadrats are only as spaces; two and three em quadrats by like a parallelogram.

two words which stand by the side of each other transposed lines are drawn from the beginning d of the first, including a down stroke at the be- This line continues perpendicularly from the his word to the bottom of the next, and is then o the end, there rising to the top. On the mar- lirections *tr.* are written. If the words are sep- out in the same line, each is noted in the proof written at the margin. When there are a num- ords to be transposed each is encircled, and over is written a number, 1, 2, 3, 4, 5. In rearrang- follow the order of the numbers. When these are very numerous it is better to write out the again as it should be. If the transposition is iple of letters in a word lines should be drawn them, while the marks on the margin may either the letters as they should be.

w paragraph is required a mark in the shape of t should be made and the sign ¶ placed in the Where a paragraph has been made which was ired a line should be drawn from the broken-off the next paragraph, and in the margin should n "No ¶." This is also marked "No par.," ak" and "run on."

several lines are to be added they should be at the bottom or top of the page or galley-slip, a line from the place where the insertion begins those lines or words to be inserted. When so added that it cannot be contained at the bottom r when it is not expedient to place it so, write in gin "Out, see copy."

rs or words are to be altered from one character er a parallel line or lines should be made under- e word or letter. Capitals require three lines, pitals two lines, and Italic one line. In the mar- osite the line where the alteration occurs, should n "Caps.," "Small caps." or "Ital.," as the case Lower case is marked l. c. In the few cases alic capitals or small capitals are required the should be as for Roman and on the margin the tyle be written. This plan should also be adopt- splay type when needed.

unctuation marks should be reinforced by a the pen to call attention to them. Periods are , and so by some printers are semicolons and It is well to emphasize all small alterations by as it enables them to be seen more easily.

letters or lines stand crooked they are noticed ing lines under and above.

a letter of a different font is improperly intro- is marked across, and on the margin *wf.*, stand- rong font, is placed.

postrophe and superior letters are indicated by he proper mark in a little bracket at the top of a rwise they would be confounded with the com- rdinary figures. Turned commas are also shown me way.

tters are shown by a mark on the margin like a ss.

thing is noticed in the proof for which there is priate mark the directions may be written at the ith a line running nearly around them. For in- take out hair" is from an actual proof where a lay across the page of type.

pains should be taken by the proof-reader to marks clear and legible. Alterations from copy e encircled, that the compositor may receive pay ork, and that the establishment may be able to charges correctly.

f-room should be in a quiet place, yet conven- he foreman and those who make up. It should be light. A twenty-foot alleyway will not give enough unless at the very top of a building. Shades should be provided for the gas, electric light or lamps. The latter are the best to read by, because they are the steadiest. Shelves should be provided to lay away proof and copy. The last should not be wrapped up and put away until the last revise is read, for a reference may be demanded. Upon its back should be labeled the work and the pages of copy, and the same if possible with the made-up pages. First proofs are rolled up and similarly marked. Page proofs are left flat and open, if electrotype, till the volume or work is done; but, if letter-press, it is more convenient to fold the press revises and lay them in order. Weights should be laid on each pile, to keep them from being blown away in summer. Where several proof-readers are employed the one who examines a certain proof should mark his initials upon it. No proof-reader should accept a dirty or smudgy proof, nor one in which all of the letters are not perfectly distinct; nor, except in pursuance of direct orders, should he ever neglect any of his customary methods of scrutiny for the sake of speed. Zealous workmen will frequently urge him to hurry up, as the form is needed at once. Comfortable seats and desks should be provided, as well as good pens and ink. All proofs should preferably be marked in ink. Lead-pencil marks are not so clear and easily rub out.

It is impossible at the present day to expect a direct return of proof. Indulgent printers have accustomed the public to the practice of having many pages on hand at once and of keeping them for some time. Where at one time one hundred pages of small pica would enable two authors to be kept going at once, now more than this will often be required for a single writer. It is therefore very important to keep a record of the time when proof goes out and when it returns, that the blame, if any, may be laid on the proper person.

With prints a proof is an impression taken before the regular impressions in quantities, or for the purpose of examination. The plate or block may not be entirely finished.

Proof-Paper.—The paper used for taking proofs. This should generally be of a good quality and tolerably thick. Proofs are usually taken on wet paper, or at least on paper which has been somewhat moistened. For this purpose various sizes should be cut, suitable for different sized jobs, and put in a convenient place. When required to be used a sponge is wet and as much as possible of the water is squeezed out. The sponge is then passed quickly over the surface of the paper, touching every part. Proofs can then be taken. On a daily paper the strips are cut of the true width, sprinkled or dipped and laid in the closet under the press. Here they retain their moisture until used. When a form is made up and corrected a proof is sometimes taken on its own paper or the exact paper which is to be used in the production of the work. This is done so that the author or publisher may be able to know what its appearance will be.

Proof-Planer.—An instrument employed for taking proof. It consists of a block of wood covered on its lower side with cloth. It is laid on the paper which is over the type, held firmly so that it will not slip nor move, and struck smartly with the mallet. Most workmen who have experience believe that when the blow is given with the handle of the mallet, held perpendicularly, the proof will be better than when struck with the head.

Proof-Press.—A press used exclusively for pulling proofs. This is usually of iron with two rims, between which the form or galley lies. Over the type is passed a great roller of iron weighing from one hundred to three hundred pounds. The surface of the roller has a blanket of cloth or india-rubber. By passing this from one end to the other the proof is very easily taken. Beneath the bed is usually a closet for paper. Hand-presses are often used for taking proof. Proof-presses which will ink the type without requiring a separate roller and which will take half a dozen proofs at once have recently been invented.

Proof-Puller.—The person whose duty it is to take proofs. On daily papers all proofs are taken by one person, and this is a rule in some book offices, particularly in England. Thus a very much better proof is obtained.

Proof-Reader.—A general term for a corrector of the press. It is the usual expression employed in the United States.

Proof-Sheet.—The print taken from the type after the compositor has finished his work which is intended to be read and corrected.

Proofs in Sheets.—Proofs of matter made up into pages, imposed and pulled in sheet form, as distinct from slip proofs.

Proofs in Slips.—Where corrections and alterations are likely to be heavy proofs are asked for in slip form —not made up into pages.—*Jacobi.* Nearly all proofs in America are taken in slips, it being regarded as an injustice to the compositor to force him to correct his matter in the form. This takes twice or three times as long, and necessitates more space on the imposing-stones.

Proscription Letters.—Large metal letters, from three-line pica and upwards, were once thus denominated. They were cast in sand. The term appears to correspond to poster letters.

Prote (Fr.).—Foreman.

Protection to the Eyes.—Dr. L. Webster Fox of Philadelphia gave his hearers at a lecture in that city some very sensible rules for preserving the eyes. Sudden changes from darkness to brilliant light should be avoided. Drugs and stimulants which affect the nervous system should also be avoided. Reading must not be done when lying down, or when mentally and physically exhausted. When the eyes become tired by looking at objects near-by, rest them by looking at objects afar off. Pay special attention to the hygiene of the body, for that which tends to the general health acts beneficially upon the eye. Up to forty years of age bathe the eyes twice daily with cold water. Do not depend upon your own judgment in selecting spectacles. Old persons should avoid reading by artificial light; be guarded as to diet, and avoid sitting up late at night. After fifty bathe the eyes night, morning and evening with water so hot that you wonder how you stand it; follow this up with cold water; that will make them glow with warmth. Do not give up in despair when you are informed that a cataract is developing; remember that in these days of advanced surgery it can be removed with little or no danger to vision. To these rules of Dr. Fox may be added the following, derived from long experience: Never rub the eyes with the end of the finger or the knuckles, as there is nearly always some lead dust or some other dirt upon them. If an extraneous substance gets in the eye hold the eye under water and then wash it gently. If it is of a size probably perceptible let some fellow-workman who is used to this service pick it out. He catches hold of the eyelid, turns it back, and quickly dislodges it. In every iron-foundry there is some man who can do this for other men, and it can be accomplished with great quickness. In printing-offices there are not many persons skilled in this way, and it is better to go to an oculist at once and pay two or three dollars for a minute's work than to lose a day's labor through it. Sore and inflamed eyes can be much helped by washing in salt and water. If the eyes are bad, and the salt and water not available, wash the eyes with pure water the last thing before going to bed. Never, if there is any difficulty with them, attempt to read or examine anything before being up at least an hour. To most persons with impaired eyes one hour's exertion at night is more injurious than three hours by day. If very bad, all night reading or work should be stopped. Very brilliant light close at hand is injurious, and so is very faint light. Avoid having the rays of the sun fall directly upon your copy or case, and do not set type in a badly lighted room. If an engagement is offered at composition in a room where there is too little light, although not perhaps so much less as to render gas a necessity, decline it. No boy should be put to case in a badly lighted room; it is sure to engender false motions. Many very young people require spectacles, and it will frequently be found desirable to change those first selected after having been in use for a year or two. Sometimes short-sighted persons between forty and fifty years of age will discover that they can no longer read proof or set small type with ease, although they can perceive objects in the distance the same as formerly. This is occasioned by the eyes having become less adjustable than before. A long-sighted man has a flat eye, and a short-sighted person has a round eye. The latter, therefore, uses concave glasses to make his eyes flatter, and the former uses convex glasses to make his eyes rounder; but in youth the muscles of the eye being easily contracted the eyeball can adjust itself to various focuses within a certain limit. As age comes on this power is to a certain extent lost, and two pairs of spectacles may be required, one for reading and the other for objects at a greater distance. When this condition of the eye occurs it is altogether wrong to adhere to one kind of spectacles only. Pebbles are better for convex glasses than glass, as they are harder and more transparent, thus being less liable to be scratched, which is common in the centre of other lenses, the form occasioning this. There is no particular object in having pebbles for spectacles for short-sighted persons, as in the centre of each lense there is only a thin film of glass, perhaps not the sixth in thickness of the lenses used by some long-sighted persons. There being a hollow here, the face of the glass is not liable to be scratched. Spectacles should be wiped with some soft substance, preferably a piece of chamois, and this should be done often. When the eyes are much fatigued and labor has ceased, it is frequently a relief to take off the spectacles. Eye-glasses are not so desirable as spectacles when either are to be worn for some time.

Proto (Ital.).—The foreman; the overseer.

Providence.—A city in Rhode Island where the typographic art was introduced in 1762, William Goddard, who had served his apprenticeship with James Parker in New York, being the first printer. His paper did not prove successful, and after a trial of several years he removed to New York. His mother became his partner in Providence, and when he determined to leave carried on the business. John Carter became a partner, under the firm-title of Sarah Goddard & Co. She died in 1770. Carter carried on business for forty-six years, and died in August, 1814. John Waterman had a small printing-office there before the Revolution. Much printing is now executed in that city. There are 6 daily and 28 other newspapers.

Provincial Houses.—A general term in England in speaking about printing-offices out of London.

Prueba (Sp.).—Proof.

Public Document.—Any book or pamphlet published by the United States, one of the States or a municipal organization to be distributed. This is often abbreviated "pub. doc.," the plural being "pub. docs."

Publisher.—One who gives forth news. This is now generally restricted to the person who manufactures and sells books at first hand, or the one who is responsible for the business control of a newspaper. The publishers of books in any country are not numerous. In Germany, where they are more abundant than elsewhere, they probably do not number a thousand, and those of England are hardly half as numerous. In America there are still fewer. It does not appear that before the Revolution there was in the colonies any publisher who was not either a general bookseller or a printer, and in most cases the one who filled one position filled all three. After the Revolution publishing became a much greater business. The one who carried it on united other callings with it; but publishing gradually became greater than its accessories. In the very earliest of these times Mathew Carey of Philadelphia and Isaiah Thomas of Worcester each did a large business. Other well-known publishers were Monroe & Francis, Isaac Riley, Evert Duyckinck and T. & J. Swords. About 1825 Washington Irving wrote home to his friends to make a contract for him for a new book with an enterprising publisher, and they wrote back to him that the leading men then in New York were G. & C. Carvill. The chief house in Philadelphia, Carey & Lea, was, however, the most important in the United States. For the first fifty years after the close of the struggle for independence books were largely published by combinations of booksellers, who divided the expenses among themselves according to the amount subscribed, and each took so many sheets of the book. As they sold the first copies they bound others, the printed stock remaining in quires until this was necessary. Occasionally as many as twelve or fourteen booksellers thus joined in a small book. There was little risk, for newspapers, magazines or unbound works did not interfere with the sales. Another practice was to send a book into some small interior town to be printed. The owner of a newspaper, always a practical printer, would have as indoor apprentices from four to twelve boys. They received on an average not over twenty dollars a year and board, and were compelled to exert themselves. Coming from the same families whose sons entered the learned professions, and being their equals as boys, they soon learned what was necessary and became very competent hands. Could the old records of such printing-offices as were in Lansingburgh, Brattleboro, Andover or Cooperstown be brought to light it would be found in many cases that contracts had been made for composition at twenty and twenty-five cents a thousand ems, employer's price. Work must be obtained for the apprentices, even if not well paid for. Paper, presswork and ink were then dearer than now, but not composition nor such engravings as they were able to obtain. These rarely cost more than a dollar or two, and Dr. Anderson seemed to have a favorite price of seven shillings and sixpence, otherwise ninety-three cents, for each of his earlier cuts.

In 1817 J. & J. Harper began business. Their industry knew no bounds. They were both enterprising and economical, while their judgment was excellent. In a few years the Carvills sank into the second rank. Until about 1837 the Harpers were still printers, doing work for every one who brought it in. Carey & Lea of Philadelphia were their principal competitors. Each of them published libraries or sets of books of the same size and bearing some relation to each other; they issued medical works, dictionaries and school-books. The machine-press helped them, as did the lowering of the price of paper and the discovery that muslin mounted over paste-board made a good cover for a book. The number of publishers increased, and their capital grew greater. English books were seized by publishers upon their arrival here without regard to the rights of the English publisher or author, and were immediately republished. In 1823 five editions of a book about Napoleon were issued in New York in the same week, each by a different publisher. In 1849 or 1850 the first volumes of Macaulay's History of England were treated in like manner. As a result of this practice very few works of light literature were issued. Some of the American books of the earlier part of the century were very creditably printed, but after piracy become common, and there was fierce competition in it, the quality deteriorated. There were few eminent names in American literature. The historical writers, such as Bancroft, Hildreth and Prescott, are the only ones whose works are still read, with the exception of Irving, Cooper and two or three poets. No one now reads Willis, Sigourney, Osgood, Simms, Paulding and Kennedy, or the essayist and religious or political writers of the earlier epoch.

After 1840 the development of American literature became greater. The newspapers began to pay writers who were not printers, capital increased, and publishers took up some branches which they had not before been willing to touch. Between 1850 and 1860 this tendency was still more marked, and since that time many causes have joined to aid the publisher. School-books were issued long before the Revolution, but began to be sent forth in numbers about 1810. From many of them fortunes have been made, as, for instance, from the mathematical series of Davies and the readers of Sanders. Of one book, first issued a century ago, a million copies a year are still printed. Subscription-books are common, and have been for seventy-five years. Weems wrote a life of General Washington which was thus sold within a year or two after the death of the hero, and for fifty or sixty years there have been publishers who cared nothing for the trade of the booksellers, as they could sell so many copies without their assistance. The family of General Grant received more for the subscription-book written by the general than either Thackeray, Carlyle or Irving received in his whole life, and nearly as much as Dickens obtained for all of his productions. Two very profitable classes have been law and medical works. These books, as well as those on theology, when very large and costly, are issued as subscription-books; when the price is not very high they are sold over the counter. Novels sell best of all; yet owing to English competition few American novelists have done well in a money sense, and the publishers have also reaped little. The two most notable exceptions to this rule are the authors of Uncle Tom's Cabin and Ben Hur. Poetry is of little value to a publisher. Twenty-five years ago several publishers began issuing unbound books in small type on pages of the size of letter or larger at very low prices. All of the new books of value for general reading were thus printed, together with the most valuable books which had preceded them. The result was that it was no longer desirable for a publisher to attempt to issue a new and readable English book on good type and a fair page. The price which had to be demanded by one engaged in the trade for an ordinary sized book was from a dollar and a half to two dollars and a half; the cheap reprint was for sale at ten, fifteen or twenty cents. There was no longer any temptation to pirate books. As a result those who had formerly opposed an international copyright law now favored one, and the desired act was passed in 1891. Little effect has yet been seen from this, but it is probable that it will result in great good.

Books are not sold in the United States by a dozen containing thirteen copies. The exact number desired is given in the order. There are two discounts known. One is to the jobber, who frequently sells an immense quantity of goods, and the other to the retailer. This discount varies from different publishers and different classes of books from 25 per cent. up to 40. Much the greater part of this goes to the retailer, and a small part of it to the jobber. School-books were formerly at a special price for introduction and a regular price afterwards, much higher. When it was believed that a certain city might change its school-books in whole or in part, an agent from each publisher appeared upon the scene and lavished favors upon the board of education. The successful competitor lowered the price of his books to one-third, one-fourth or one-fifth of the regular retail price, and frequently made an allowance for the books which had previously been used. Much of this injurious work has been done away with, for the chief school-book publishers in the country have consolidated their forces, manufacturing more cheaply and thus being able to sell more cheaply. Their union has enabled them to obtain higher prices. Subscription-book publishers have two classes of agents. One class has long been employed in selling books, while the other is composed of those who have been thrown out of other occupations and have taken up this line because there is nothing else open to them. As soon as a subscription-book house determines to issue a new book of a popular character it prepares a title-page, prospectus and a few pages of the book, which may not yet be written, and gives these pages, nicely bound, to its agents, together with a few blank pages upon which the names of subscribers can be written. Canvassing then begins. The book is hurried through and copies are delivered to those who have subscribed, while the canvass is renewed for other names. A campaign life of a new candidate for the Presidency has frequently been written in ten days and in the hands of the subscriber in three weeks. Few of the more popular works sell for a longer time than two or three years. Some do not sell beyond the first year. The commissions given vary from 33 to 60 per cent. Fifty is not generally regarded as being too large. The books are sold to general agents, who in turn employ canvassers. Some canvassers on good books earn much money, and cases are known where from six to eight thousand a year has been paid. Subscription-books, being made to order, with the price often fixed upon before the work is written, are usually in cheap but showy binding, large leaded type and on thick paper. These increase the size and apparent value of the book, while the cost of production is very little more. Many valuable books, however, are published upon the subscription plan. They would otherwise never reach the persons for whom they were intended.

The expenses of a publishing house are for manufacture of its books, their advertising, the free copies and the packing and carting. To these must be added what is paid to the writer. Few of these are popular enough to receive more than merely living expenses while the work is going on. Here and there some earn from three to six thousand dollars a year; but this is a great exception. Writers are generally paid in the United States upon commission, or 10 per cent. of the number of copies printed, at retail price. Occasionally it is so much down and a commission besides; and once in a while a writer, such as P. T. Barnum, who knows that he is a great attraction, will receive from 20 to 40 per cent. A common method of issuing books requiring much labor which will sell for many years is to employ the writer for a fixed sum, he paying all expenses and seeing the proofs through the press. This is generally a very economical plan for the publisher if he does not pay out his money too rapidly and find himself left in the lurch with a book half written, the writer declining to go on. Another plan in the United States, although not so common, is for the author to pay for the composition and the plates, and then to receive 15 or 20 per cent. of all the sales over a certain amount. This is very safe for the publisher. In England a very common contract is for half profits. All of the expenses are calculated and charged for. If the sales amount to this sum the author receives half of all the profits beyond. This is strongly objected to by the Authors' Society, as everything in favor of the publisher is entered up at the highest rate in this account, while the publisher himself receives a discount. He also charges for the labor of his salesmen and porters, an undue ratio for general advertising and full rates for advertising in his own periodicals. An out-and-out payment for a book is exceedingly rare, either in England or America.

In issuing a book few publishers rely entirely upon their own judgment. They employ an expert literary man known as a reader, who examines the manuscripts. If he decides favorably the publisher may also read it in whole or in part, to determine its commercial availability. Sometimes it is examined by two or three readers. If accepted a written agreement is usually made with the author on one of the plans previously mentioned, each party retaining a copy. If publication is decided upon immediately a rough calculation is made by the publisher as to size, type, style of binding, size of edition and selling cost, and after consultation with the printer and the binder, which may result in a modification of the shape or size, work begins. A comparatively thin book with a large page has an advantage over a book with a smaller page, as in the latter there is more presswork and more paper is required. A sounder binding can also be given for the same price. If there are illustrations it is probable that the author has most of the drawings and photographs necessary, and from these in an expensive book wood-engravings are made, but in a less costly work process engravings. In many cases, however, special artists must be employed. If the engravings to be made are numerous and excellent composition will not begin for several months, as much time is requisite for this purpose. Frequently publishers avail themselves of old cuts which they have in stock. A portrait of Marie Antoinette could be shown in a history of Austria as well as in a history of France; and Windsor Castle and the Tower of London could be employed in any work which deals with English history, topography or archæology. It is not generally considered expedient to give out a book of literature or general reading to many men. If the author has sixteen pages a day to read in proof he is generally behindhand. The title-page, table of contents, and so on, are printed last. Indexes can be compiled better by those who make this a business than by authors. It is usual to make an announcement in the literary papers when the work has been determined upon, and another when nearly ready for publication. These are news paragraphs and are not paid for. About the time when copies are to be issued a small advertisement is inserted in several journals, but a much larger one in more newspapers when they are first exposed for sale. It is customary for the author to have a certain small number of copies for himself, but the critics are provided with theirs by the publisher. When time is an element of importance these are often sent simply stitched, the first copies from the press being put together hastily. Afterwards a better copy is directed to the newspaper.

The books, if distributed directly by the publisher, are boxed with other works which have been ordered. Some publishers allow unsold copies of a new book to be returned if unsalable; but this is not common. Many booksellers get their books from wholesale agents, who are continually sending out packages to them. Subscription-books are sent to general agents, who supply their men. Each of these has previously been furnished with a "dummy," upon which he has canvassed. In country districts agents generally supply those who have ordered through them, but in the cities there are deliverers. The same plan is practiced with books in parts, the agent, however, nearly always glossing over the fact that an appropriate binding would of itself purchase several good books. When the first edition is printed, if it is likely to require another, it is corrected in the plates if errors have been found, and put away in the vaults. If the edition was worked from type this has probably all been distributed, except the last three or four forms, before the completion of the work, and the author can entirely recast it for a new edition if one shall be required. On few books is there an absolute loss; on many there is some profit, while there are some on which large fortunes have been made.

The publisher of a newspaper or periodical is really responsible for all of the details of its business management. He receives and pays out the money through his bookkeepers and clerks; he directs the number of copies to be printed, establishes agencies and determines upon the expenses of the establishment. Under his control are the carriers or deliverers, the mailing-room and the advertising agents and solicitors. To the owners he is responsible for the success and pecuniary profit to be derived from the journal, which, however, is largely influenced by the editor. No publisher can make a journal a success when the editorial management is in incompetent hands. Sometimes the publisher has not even the privilege of saying how much or how little shall be spent each week for editorial expenses or news; but generally this is his prerogative. He cannot, however, direct what persons shall receive the money, nor how it shall be divided. The composing-room, pressroom and counting-room are under his control.

Publishers' Binding.—An ordinary term used for cloth-binding.

Publishing.—1. Giving forth news. 2. In America, all the acts which give an income to a newspaper or which pertain to its business management; in England, the distribution of the journal among the agents and subscribers by the home office. 3. Placing books on sale and attending to those details which will facilitate their purchase and delivery.

Puentes (Sp.).—Furniture or quotations used in an open form.

ACHILLES H. PUGH.

Pugh, Achilles Henry, a printer of Cincinnati, was born in that city on November 24, 1846. His father, Achilles Pugh, was identified with the anti-slavery cause at a very early date. He was the publisher in 1836 of the Philanthropist, whose type was entirely destroyed by a mob. From 1838 to 1846 he was proprietor of the Cincinnati Chronicle. A. H. Pugh was educated in the public schools of Cincinnati and graduated from Hughes High School in 1865. From 1865 to 1874 he followed the profession of a civil engineer, being for five years in Western Kansas, Colorado and Utah in the construction of the Kansas Pacific, the Atchison, Topeka and Santa Fé and the mountain railways of Colorado. In the spring of 1875 he bought the job-printing business which had been carried on by his father, who began it in 1832, and has since been identified with it. Under his management it has been very successful. In 1877, together with A. O. Russell, he was selected as delegate by the employing printers of his city to the first general gathering of the printers of America, which formed the body now known as the United Typothetæ. Upon his return he was elected president of the Cincinnati organization, a position he held until elected president of the United Typothetæ of America in 1890. The next year he presided over the meeting at Cincinnati. He has been a delegate to every meeting of the United Typothetæ and has taken an active part in each.

Pugillaria (Lat.).—Tablets upon which wax was placed, so that they could be written upon with the stylus. There were from two to eight leaves, connected at the back with rings and covered with parchment and afterwards with boards.

Pull.—To pull or move the bar of the hand-press so that an impression may be given. To pull a proof is to take a proof.

Pull Over.—The act of bringing the bar-handle of a press from one side of the press to the other.

Pulled Home.—When the bar of a hand-press is pulled entirely over so as to touch the near side.

Puller.—In the wooden hand-press, and in all those where beating the form with balls was practiced, the person who pulled the bar of the press. He was no more the pressman than the beater, both being journeymen; but since the general use of composition rollers the term puller is no longer used. He who does this work is the pressman. Prior to the introduction of Lord Stanhope's iron presses, Mr. Hansard remarks, beating was the lighter labor and pulling the heavier, to the latter of which an apprentice was seldom put, except for very light work, for the first twelve months. Then pulling became the lighter, the stronger beat and the weaker pulled; but when rollers were introduced the stronger again took the bar and the weaker rolled, and a well-grown lad was capable of taking both parts in the first month of his service. In 1825 pulling was the only hard labor, the rolling simply requiring a due degree of adroitness and attention to color.

Pulls.—A term applied to proofs or printed copies from a form.

Pulp.—The material used for paper-making, after being digested and reduced to a soft, moist mass, preparatory to its transformation into sheets.

Pulp-Boards.—Cardboards made from pulp of any thickness—not pasteboard.

Punch.—An original type, made on steel or other hard material by a letter-engraver, which serves as the parent of all other letters of the same face. It much exceeds in dimensions the type which is to be made from it, as it is longer and thicker, thus giving a better support to the lines of the face, from which the shoulder descends slopingly. It has no nick, and the foot is perfectly square, so that when needed a hammer can be used upon it. Upon the execution of the face of the punch everything depends in the way of beauty and accuracy. When the letter-cutter begins work upon it it is a piece of soft steel of excellent quality. Having reduced the top to something near the size of the letter which is to be engraved upon it, he begins cutting, the letters H and m being first made. Whatever size the type is to be the m is calculated to be exactly in the centre of the body, up and down. It may cover four-tenths of the height, as in some of the faces cast by Bodoni; it may be one-half, as was the more common practice in England at the beginning of the century, or it may cover five-ninths or four-sevenths, as is the more common practice now. It should be observed that the fitting up of the body is not done by the letter-cutter, and that an m he may make for bourgeois might possibly be used in a long primer or a brevier. This is determined by the length of the ascenders and descenders, the letters which go above the square and round letters and those which go below. From the top of a d to the bottom of a g is usually nine-tenths or more of the body, only a very small support being given above or below. Having made the m, the cutter next essays a capital H and then an o. The latter, and in fact all letters which have hollows within, have them made by counter-punches, a tool having at its end an oval, a circle or other regular form. This is of hardened steel, and is driven into the soft steel by a hammer. Allowing then for the necessary thickness of line the outside is cut away by files, gouges and other cutting instruments. The top of the n, r, u and other centre letters must be exactly alike for height, and the bottom must also correspond; but the o and other round letters are a little larger, say one in fifty. This is to correct an optical illusion, which makes them look smaller than they really are. The weight of line must be determined from the beginning, as also the thickness of the letters. The lines are of three thicknesses, one the heavy stroke in capitals, another the heavy one in small letters, and the third the light line in both. The last is generally as thin as it can be to give wear, while the former sometimes reach a sixth or a seventh of the depth of the letter in Roman faces. Formerly they were much heavier, both the light and heavy. The width of the character is also important.

It sometimes happens that a lower case m measures five-sixths of an em, but it may fall below two-thirds. It is evident that the lines must be lighter in the last, if the white space is to show equally. These questions are all determined while the first letters are making, and each one is carefully compared with those made before. Proofs are taken by smoking the punch in a lamp or candle and then making an impression on a piece of paper. It will frequently happen after the whole font is completed that a comparison of the types which have subsequently been cast from them will determine some to be faulty. They must then be cut over. Capitals are frequently used for new styles without recutting, only the lower case being made anew, and this also happens with reference marks, figures and small capitals. Display fonts are more easily made than Roman, as they are not examined so closely and there is not the need of so strict a correspondence between one letter and another so long as there is a general resemblance. Scripts are generally accounted the most difficult to cut, one face having been made in New York a few years ago which cost over four thousand dollars for cutting and fitting up matrices. The hair-lines would not join. Roman is the next most difficult. It is generally supposed to take from a third to two-thirds of a day to make a Roman letter. In the early ages of printing punches were made of brass, copper and types, the latter if tolerably hard being good enough to make matrices in lead and type-metal alloys.

Of late a machine has been in use for making punches, an original being given to the cutter to work by. The principle is that of a pantagraph. It is the invention of Benton, Waldo & Co., of Milwaukee, and has been used successfully to make letters for typesetting-machines. From the one model letters of any size can be made, the machine enlarging or diminishing at will.

Puncheon.—A punch.

Punctuation, or Interpunction.—The art of employing certain signs so as to indicate pauses, connection or change between certain words. Frequently, and in fact generally, there is a stoppage of the voice in the places where marks of punctuation are used, but this is by no means necessary, as they are chiefly addressed to the eye, and denote grammatical relations rather than vocal pauses. The word is derived from the Latin interpungere, to point. The Romans were acquainted with the term, as appears from Cicero and Pliny, but with them it had a totally different meaning from that in which it is now used. Their points, as well as those of the Greeks, were almost entirely oratorical, or confined to the delivery and punctuation of the words, and there were often no points, or at most there was only one at the end of a sentence; or pauses were indicated by breaking up the matter into lines and paragraphs. Modern punctuation is of later origin, and the invention has been ascribed to the Alexandrian grammarian Aristophanes, after whom it was improved by succeeding grammarians; but it was so entirely lost in the time of Charlemagne that he found it necessary to have it restored by Warnefried and Alcuin. It consisted at first of only one point used in three ways, thus called stigmeology; but it was sometimes a stroke, the latter being continued by the Dutch in religious books up to within a hundred years.

The present art of punctuation consists in applying the several points in their proper position in the sentence, so as to bring out the sense most clearly. This follows the grammatical construction, and not the tones of the voice nor the devices by which attention is called to particular portions. The marks of punctuation are nine: the comma (,), semicolon (;), colon (:), period (.), note of interrogation (?), note of exclamation (!), brackets ([ ]), parentheses ( ), and dash (—). In straightforward reading matter only the first four are much used, the next two occurring generally in anecdotes, novels and dialogue matter. Brackets and parentheses are little employed, in comparison with the comma or semicolon, and the dash is chiefly used as a mark of punctuation by those who will not take the trouble to learn its rules and are content with slipshod pointing.

The comma marks the smallest pause. It generally denotes that the part of the sentence before it is followed by another clause which adds to, explains or diminishes the force of the preceding part, and is explanatory or augmentative. In most of these instances it has the value of a parenthesis. Thus in the following case the sentence "It is desirable to avoid, as much as possible, the use of two leads pieced together," the sense would be as perfectly conveyed, and it would be as correct, although a little old fashioned, to write: "It is desirable to avoid (as much as possible) the use of two leads pieced together." Such explanatory sentences may be very long and composed of several clauses, each of which defines or is additional to the other. Of this the following is an example: "If it be necessary to dry a few printed sheets· immediately· for any sudden emergency, such as completing the sheets of a volume, calcined magnesia may be dusted over them, which will not sensibly affect the color of the ink· and yet remove or absorb so much of it· as remains above the surface of the paper." In this case the turned periods indicate places where some punctuators would insert commas, as they guide themselves by sound and by a desire to emphasize. This, however, is an erroneous method. The cadence of the voice has nothing to do with punctuation. The above sentence, if taken in its simplest form, is "If it be necessary to dry a few printed sheets calcined magnesia may be sprinkled over them." This contains the framework of the sentence. All of the other words, as "immediately," "for any sudden emergency," or "such as completing the sheets of a volume," are explanatory; or they are additional, as "which will not affect the color of the ink," "sensibly;" or additional and explanatory both, as "and yet remove so much of it as remains above the surface of the paper," and "or absorb." An explanatory sentence, if it does not join perfectly to the preceding part, requires a comma before it and after it, to set it off; but when the explanatory sentence is very short, and the explanation is of a nature which will read smoothly, it is not the custom to put commas on each side. A sentence, no matter of what length, which is regularly formed and simple, having no explanatory or interjected clauses, requires no comma. Each additional clause, so long as not to weave in smoothly, requires two commas, one before and one after. When short and joined with the main sentence by a copulative conjunction, points are omitted. The following examples of correct punctuation of the comma are taken from Murray's Grammar, but altered to the standards now adopted:

1. The fear of the Lord is the beginning of wisdom.
2. Every part of matter swarms with living creatures.
3. The good taste of the present age has not allowed us to neglect the cultivation of the English language.
4. To be totally indifferent to praise or censure is a real defect in character.

It would be wrong to have a comma after has and before not in example 3, and after censure and before is in example 4.

5. I remember with gratitude his goodness to me.
6. His work is in many respects very imperfect. It is, therefore, not much approved.

In No. 5 some proof-readers place commas on each side of the words "with gratitude," and in No. 6 they insert them on each side of "in many respects." The better usage is, however, as is shown. The commas with the word "therefore" in the last sentence would not be thought necessary by many good punctuators. When the interruptions are slight and unimportant it would be better to omit the commas, as in Nos. 7 and 8:

7. Flattery is· certainly· pernicious.
8. There is· surely· a pleasure in beneficence.

When two or more nouns occur in the same construction they are parted by a comma, as:

9. Reason, virtue, answer one great aim.
10. The husband, wife, and children suffered extremely.
11. They took away their furniture, clothes, and stock in trade.
12. He is alternately supported by his father, his uncle, and his elder brother.

Authorities are divided as to whether the comma should be used before "and" in these last three sentences. In this work it has been omitted. Murray says that when a conjunction is divided by a phrase or sentence from the verb to which it belongs such intervening phrase has usually a comma at each end, as:

13. They set out early, and, before the close of the day, arrived at the destined place.

Most writers would endeavor to avoid the necessity of a comma in such a place, and the sentence would read much better were the points here suggested omitted. A word or words in the case absolute, the infinitive mood absolute, the vocative case, and that form of the vocative which is most used in English, when a person or persons are addressed, are all separated from the remainder of the sentence by a comma when an exclamation mark is not required, as:

14. My son, give me thy heart.
15. I am obliged to you, my friends, for your many favors.
16. His father dying, he succeeded to the estate.
17. At length, their ministry performed and race well run, they left the world in peace.
18. To confess the truth, I was much at fault.

Nouns in apposition, that is, nouns added to other nouns in the same case by way of explication or illustration, when accompanied with adjuncts are set off by commas, as:

19. Paul, the apostle of the Gentiles, was eminent for his zeal and knowledge.
20. The butterfly, child of the summer, flutters in the sun.

If such nouns are single, or only form a proper name, they are not divided, as:

21. Paul the apostle, Xavier the missionary, and Moody the evangelist.
22. The Emperor Antoninus wrote an excellent book.

When words are placed in apposition to each other, with some marked variety, they require to be distinguished with a comma, as:

23. Though deep, yet clear; though gentle, yet not dull;
Strong, without rage; without o'erflowing, full.
24. Good men, in this frail, imperfect state, are often found, not only in union with, but in opposition to, the views and conduct of one another.

The last of the commas, in places like that in the latter example, is frequently omitted.

Commas should commonly be omitted, when there is a doubt as to their propriety, in any cases where the grammatical construction or the sense does not demand them.

The semicolon is the point next greater in value than a colon. Usage of the present day limits its employment to a very few cases, where a secondary sentence, comparatively complete in itself, or a combination of words which are grouped together in signification, but are to be followed by other groups of words, the whole referring to one verb. Thus the first of the following sentences is properly punctuated with commas, and the second with semicolons:

25. England has been the nursery of seamen, France of artificers in gold and silver, and Germany of bookworms.
26. England has been the nursery of seamen, merchants, and adventurers; France of artificers in gold and silver and all the devices of the jeweler's art; Germany of the producers and lovers of books and of bookworms.

The colon is much less used than the other marks. In this age it nearly always indicates the partial completion of a sentence, which can be concluded only with another sentence or part of a sentence. It is therefore much like a comma or semicolon, with expectancy added, as:

27. The Scriptures give us an amiable representation of the Deity in these words: "God is love."
28. He was often heard to say: "I have done with the world, and I am willing to leave it."

When the sentence is not set off, and only the idea is quoted, not intending to give the whole sentence, no punctuation mark is used, and the words follow after, with or without quotation marks, as:

29. The Scriptures say that God is love.
30. Prescott declares that "by the written law of the land the sovereign was empowered to nominate a regency in case of the minority or incapacity of the heir apparent."
31. Herbert Spencer tells us that radicalism endeavors to realize a state more in harmony with the character of the ideal man than now exists.

Another use of the colon is when several sub-sentences, each ending with a semicolon, close with a part of a sentence which emphasizes, clears up or consolidates the preceding ones, as:

32. A divine legislator, uttering his voice from heaven; an almighty governor, stretching forth his arm to punish or reward; informing us of perpetual rest prepared hereafter for the righteous, and of indignation and wrath awaiting the wicked: these are the considerations which overawe the world, which support integrity and check guilt.

The period is the longest pause. It always indicates, as a mark of punctuation, the close of a sentence. Such a sentence, however, may be followed by another with which it is interwoven by sense, if not by grammatical construction, and in these cases semicolons may sometimes be used. An example of sentences completely separated, both in thought and grammatical construction, is given in example No. 33, and of sentences where only the grammatical construction is different in No. 34:

33. England was known to the Romans. The ratio of the circumference of a circle to its diameter is as 3.14159 is to 1.
34. The Supreme Being changes not, either in his desire to promote our happiness or in the plan of his administration. One light always shines upon us from above. One clear and direct path is always pointed out to man.

Many well-informed persons would point the last two sentences as one:

35. One light always shines upon us from above; one clear and direct path is always pointed out to man.

A period may sometimes be admitted between two sentences, although they are allied by a disjunctive or copulative conjunction. The quality of the point does not always depend on the connective particle, but on the sense and structure of sentences. The period should be used after every abbreviated word, as A. D., for Anno Domini; N. S., new style; U. S., United States. When thus used it does not require another period after it to show that the sentence is concluded, but one suffices for both needs.

The dash is a mark of punctuation which has few rules, and which is little used by accomplished writers and printers. It primarily denotes an interruption or violent change, as:

36. If thou art he, so much respected once—but, oh! how fallen! how degraded!
37. Here lies the great—false marble, where?

The point of interrogation is used in asking a question, as:

38. Who will accompany me?
39. Shall we always be friends?
40. Who adorned the heavens with such excellent beauty?

A point of interrogation is improper after sentences which are not questions but only expressions of admiration or of some other emotion, although they may seem interrogative in form, as:

41. How many instances have we of chastity and excellence in the fair sex!
42. With what prudence does the son of Sirach advise us in the choice of our companions!

A note of interrogation should not be employed in cases where it is only said that a question has been asked and where the words are not used as a question:

43. The Cyprians asked me why I wept.

To give this sentence the interrogative form it should be expressed thus:

44. The Cyprians said to me: "Why dost thou weep?"

The note of exclamation refers to expressions of sudden emotion, surprise, joy or grief, and also to invocations or addresses, as:

45. Hear me, O Lord! for thy loving kindness is great!
46. Murder! fire! robbers!

47. Death! ere thou hast slain another,
Learned and fair and good as she,
Time shall throw a dart at thee.

48. Ho! without there! my guards!

The interrogation and exclamation points are indeterminate as to their quality or time, and may be equivalent to a semicolon or a period, as the sense may require. The meaning is signified and discriminated by their use, as will be seen by the following:

49. What condescension! What condescension?
50. How great was the sacrifice! How great was the sacrifice?

The interrogation and exclamation points, when used several times in succession after words, are followed by an en quadrat, and the next word is in lower case. But a single exclamation or an interrogation, when ending a sentence, takes an em quadrat after it, and is followed by a capitalized word.

The parenthesis is a clause containing some necessary information or useful remark introduced into the body of a sentence obliquely, and which may be omitted without injuring the construction, as:

51. Every planet (as the Creator has made nothing in vain) is most probably inhabited.

52. He found them asleep again (for their eyes were heavy); neither knew they what to answer him.

53. To gain a posthumous reputation is to save four or five letters (for what is a name besides?) from oblivion.

The parenthesis contains no stop at the end inside of the curves, but the punctuation mark which belonged to the word preceding it is placed after it, so that the whole may be included in the sentence. A parenthesis, however, may be interrogative or exclamatory, and in these cases it concludes inside of the last parenthesis with the mark showing this, as in example No. 53. Parenthesis should be sparingly used, and only in places where commas will not answer so well. The whole of a parenthetical sentence which has no particular relation to the former sentence will take a period inside the last curve, as:

54. Edward Everett was the most polished speaker of his day. He had been graduated with high honors at Harvard, and had studied at Göttingen. He was intended for the ministry and gave great attention to oratory. (He was for a short time the pastor of a Unitarian church in Boston.) When, therefore, he espoused the Whig cause, seconding Webster in his efforts to establish the rule of those who reasoned, and were not controlled by their prejudices, it was believed that the supremacy of that party in Massachusetts never could be overthrown.

The following are examples of erroneous punctuation:

55. Know then this truth; (enough for man to know,)
Virtue alone is happiness below.

56. Know ye not, brethren, (for I speak to them that know the law,) how that the law hath dominion over a man as long as he liveth?

Brackets (or crotchets) are treated exactly like parentheses. They differ from them by being interpolations from outside, rather than those of the writer or speaker who furnishes the current of the discourse. Thus applause, in a report of a speech, sometimes is run into the sentence, as [applause], and sometimes it makes a separate sentence [Applause]. In the latter case the previous word ends with a period, and another period is inside of the last bracket. In general a bracket is more emphatic than a parenthesis.

Two punctuation marks are not used together. It is frequently the case that writers add a dash to a comma, a semicolon, a colon or a period. This is erroneous. Each mark is sufficient in its place. In a side-head the dash is not used as a mark of punctuation; it is ornamental. Many newspapers in Boston employ em quadrats in such a place. This rule applies to the comma, semicolon, colon, dash, period, interrogation mark or exclamation mark. Any one of these may be employed with brackets or a parenthesis when the sense requires. A period when used as a mark of abbreviation can be employed with any other mark. In this case it is directly against the word which is abbreviated, and if at the end of a parenthesis which concludes a sentence another period is required outside the last mark. Below are examples:

57. In Richmond, Va. (which has been the capital of that State for a hundred years), are many historical associations.

58. Do you mean 1600 (O. S.) or 1601 (N. S.)?

59. This book was written by Ingersoll, for a long time chief of staff. He had the degree of doctor of laws (Harv.).

In French usage the punctuation marks are generally separated from the word which precedes them by a space, on the theory that the point relates to the whole of a certain part of a sentence and not to the particular word. Two hundred years ago this usage was somewhat followed in England. In Spanish the exclamation and interrogation marks are used at the beginning as well as at the end of the interrogative or exclamatory sentence. This would seem to be a very good idea, but it has never been followed in English. In our language the comma and the period are directly against the word which precedes them, while the exclamation mark, interrogation mark, colon and semicolon are preceded by a five-em space or a hair-space. In a wide-spaced line these may be changed for a four-em space, but it is not allowable to increase them further. In some fonts the space is cast with the character. After the four points just named it is usual to place an en quadrat when setting, although the rest of the line has only thick spaces. A period requires an em quadrat. In France this space is usually only an en quadrat. When a line is wide spaced the em quadrat should be changed the last, and it ought not to be enlarged until all the other spaces have been increased to two three-em spaces, and then only equally with them beyond that. For instance, if in one place there are two three-ems and a five-em, then after the period there should be an em quadrat and a five-em. In reduction the em quadrat should be the first, and proceed at the same arithmetical ratio as the others. The thick space may be reduced elsewhere to a five-em; the em quadrat may be reduced to two thick spaces and a five-em.

Nearly all of the punctuation marks are used for other purposes than that of punctuation.

Punjaub or **Punjob.**—Copy given out on many American morning newspapers merely to keep compositors employed at hours when they would, under existing rules, charge for time if no copy were furnished, as compositors claim a certain amount of compensation for each hour when obliged to wait for copy; also called time copy. These definitions are from Caspar, but are unknown in New York and Boston, where similar copy is called bogus.

Punkt (Ger.).—The period, full stop.

Punkturen (Ger.).—Points (of a press).

Punkturlöcher (Ger.).—The point holes.

Punkturzange (Ger.).—The pincers.

Punta (Sp.).—Bodkin.

Puntare (Ital.).—To point a sheet upon the press.

Punteggiatura (Ital.).—Punctuation.

Punti Tipografici (Ital.).—The points which determine the size of the body of type, as nine points, ten points. The system and size are those of Didot.

Puntilla (Sp.).—A needle placed in a handle, used by pressmen for picking dirt out of letters in a form.

Puntine (Ital.).—The points of a tympan.

Punto (Sp.).—Point. The type used at the present time in Spain as made according to the Didot system of points. Puntos corridos, leaders.

Punto e Virgola (Ital.).—Semicolon.

Puntuación (Sp.).—The points of punctuation, in a general sense.

Q

Q IS the seventeenth letter of the alphabet. It is one of the most infrequent, and is always followed by u when there is no abbreviation. In thickness it is a little more than an en quadrat, or about eight-fifteenths of an em. There is some resemblance between the capital and the small letter, both having an oval and a descending tail, but the position in the latter is very different from that in the former. This capital is the only one which is a descending letter. The letter is not found in Greek. As a Latin numeral it signified 500; with a dash over it, 500,000. As an abbreviation it stands for quæstor, quartus, quinquennalis, que; Q. TP., quo tempore; QUIR., quirinalia; Q. R., quæstor reipublicæ; D. N. M. Q. E., devotus numini majestatique ejus. In English Q. stands for quarter, queen, query and quart.

Quad.—The common abbreviation for quadrat, which in fact is never spoken of otherwise in the printing-office. The plural is quads. In England quad. is also used as an abbreviation for quadruple, and forms combinations with the names of almost all ordinary sizes of paper. The period is not then used. Quad royal equals four royals, 50 by 40 inches; quad pot, 32 by 26 inches; quad post, 40 by 32 inches; quad smalls, cards equaling four smalls, 7 by 5 inches; quad medium, 48 by 38 inches; quad large, 9 by 6 inches; quad foolscap, 34 by 27 inches; quad demy, 45 by 35 inches; quad crown, 40 by 30 inches. To quad out is to fill out lines with quadrats or blanks.

Quadrant.—A small crescent-shaped piece of iron or steel used for the movement of the vibrating-roller on a platen-machine.

Quadrant-Machines.—A small cylindrical printing-machine adapted for jobbing purposes, made by Messrs. Powell & Son in England.

Quadrat.—The wide and thick space used by compositors where there is a large blank. The lower corner of the lower case is appropriated to quadrats, three kinds being placed together. The em quadrat is the basis of computation for all spaces and quadrats. It is a parallelogram, about three-quarters of an inch high and perfectly square on its four sides. A line is said to be so many ems wide if so many em quadrats will enter it. This name is derived from the letter m, which approximates to an em in thickness, but it does not appear that it ever really was of that size. An em quadrat begins a paragraph in all common matter, separates one sentence from another when the end is indicated by the use of a period, begins the second and succeeding lines in most hanging indentations and is of much use in table work. Daily newspapers permit spacing as wide as this in case of necessity. This quadrat is not used in France at the end of complete sentences, but the period is there followed by an en quadrat or by the space of the rest of the line. The en quadrat serves instead of the composing space when it is desired to widen the spacing in order to justify a line; it is used after a colon and a semicolon, and also after an exclamation or interrogation, when these do not make separate sentences; it indicates in table work the distinction between dollars and cents and frequently does in other places; on some daily newspapers, as the London and the New York Times and the New York Tribune, it is the common space between words in editorial matter, which is more widely spaced than the other portions of the papers; and it serves a valuable purpose in tables, where, being of the same thickness as the figures, it answers for blanks and justification. The larger quadrats are cast in two and three em sizes. These blank out all break-lines and are used wherever a space is desired. Type-founders formerly used to make four, five and six em quadrats, but they have now abandoned this practice, except to supply the demand from typesetting-machines and from some foreign countries. They, with all other quadrats and spaces, are cast high or up to the shoulder of the letters which print, for use in stereotyping and electrotyping. Quadrats should always be placed at the end of a break-line, and the spaces necessary for justification should be next the matter. They should not be intermixed with quadrats through the line. When a large quantity are used together to make a blank the two and three em quadrats should be used interchangeably, the second line not falling just like the first, so that the joints may not come together, and it is also a good practice to turn around some of the quadrats so that they will bond each other. Quadrats are made of softer metal, having less tin and antimony than the other characters. They thus weigh more, as lead is of a greater specific gravity than the other two metals and costs less. It is a common practice in many offices for compositors to throw all the pi and broken letter around their stand into the quadrat box. This is a very dirty habit and ought to be suppressed by every foreman. A quadrat is always spoken of in printing-offices as "quad." The whole word seems too formal. JEFFING, which see, is done with em quadrats. Dotted quadrats are leaders.

Quadrat-High.—Anything, such as spaces or furniture, made to the height of quadrats.

Quadraten (Ger.).—Quadrats.

Quadrature (Ital.).—Quadrats.

Quadruple.—In English usage, any sheet made four times the size of a smaller sheet, such as quad demy, &c.

Quart (Ger.).—Quarto.

Quarter Bound.—Books bound with their backs only in leather.

Quarters.—Many forms are said to be in quarters, not from their equal divisions, but because they are imposed and locked up in four parts.

Quartino (Ital.).—The four pages of a form which are imposed together.

Quarto.—A sheet of paper folded into four leaves, or eight pages. In books it is the size next smaller than folio, the length being the same as or a little shorter than octavo, the width being considerably more.

Quarto-Galley.—A wide galley suitable for works of that size—distinct from slip galley.

Quaternions.—Four pages or two leaves of a book nested with other leaves to the extent of four, six or eight, so as to make a section of a book, in the binder's sense.

Quebrada (composición) (Sp.).—Open matter.

Quebrado (Sp.).—Open or fat page.

Quebrados (Sp.).—Fractions.

Queen Note-Paper.—A size of writing-paper used in England, 5⅜ by 3½ inches.

Quemar el Papel (Sp.).—Literally, "to burn the paper;" to print a great deal, but badly.

Querduodez (Ger.).—Sheet of twelves the broad way.

Querformat (Ger.).—An oblong form.

Query.—The mark which the proof-reader puts against a word, designed generally to call the author or editor's attention to some inaccuracy or some discrepancy. The lapses of the best authors are numerous. The mark may be ?, Qy. or Q.

Quinternetto (Ital.).—A part of a signature, forming a cut-off.

Quinternions.—Paper folded in sections of five sheets, quire fashion.

Quire.—1. The twentieth of a ream of paper, consisting of twenty-four sheets.

2. A set of four sheets of parchment or paper folded so as to make eight leaves; the ordinary unit of construction for early manuscripts and books.

3. A set of one of each of the sheets of a book laid in consecutive order ready for folding.—*Knight's Mechanical Dictionary.*

4. A book. In this sense the word is obsolete. Books in quires are books not folded or bound. Before the introduction of stereotyping as many copies of a book were printed as it was thought would supply the entire demand, or at least enough for a year or two. These were laid away until the time came to bind them. The latter operation did not take place until there was an actual demand for the books, and the sheets remained in the warehouse sometimes for ten or twenty years, the surplus sheets being then sold to occupations like trunk making, where a lining was required.

Paper was formerly always more or less imperfect when made by hand. The defective sheets were placed together, a quire being on each side of the ream package. These were called outside quires, and the others were known as inside quires. The printer did not give account of the outside quires, which were regarded as wrappers. These were his perquisites. Out of the forty-eight sheets, however, he was nearly always able to cull some very good ones. This distinction between inside and outside quires is noticeable now only in hand-made papers. Machine-made papers are of uniform quality. On some papers twenty-five sheets make a quire, and in England 516 sheets are sometimes allowed to a ream. Stationers in making up blank books take but twenty-two sheets to the quire. The forty sheets over are allowed for outside and fly leaves and for waste in ruling. On the inferior papers that are used for cheap blank books it is usual to allow but twenty and eighteen sheets, sometimes sixteen and fifteen, to the quire. This practice of having short counts is very misleading, and many stationers now sell books upon the number of pages or actual sheets.

Quired-Paper.—Reams of paper folded in quires—not sent in flat.

Quirewise.—Jobs of single leaves printed on both sides of the paper, that is as first and third pages. This allows of sewing instead of stabbing.

Quitar Pastel (Sp.).—To clear up pi.

Quoins.—Small wedges of various sizes, usually of wood, used for tightening or locking up forms. In this country they are generally of hickory or boxwood, the last being esteemed the best. They are of the height of spaces and quadrats, and should not bevel very much. If their angle of inclination differs from that of the sidestick or footstick they hold only for a portion of their length. Of late years many mechanical quoins have come into the market. The simpler kind is like a section of an iron sidestick, generally having a hollow on the top where the point of the shooting-stick can enter. Others are double, and generally with a tongue on one side fitting into a groove on the other side. The latter are also made with teeth on each side, into which a rotating key fits. When this is turned the left-hand part of the quoin moves down and the right-hand part moves upward, thus tightening the form beyond the capacity of a mallet. These mechanical quoins are now much used. They have an especial value in pages containing tables, curved rules and justification of one kind of type with another, as the pressure can be applied without concussion. They are admirable on all medium-sized forms. Very large and heavy pages, however, which are to be transported any distance, as, for instance, those on a newspaper, are better locked up with wooden quoins. They are less affected by jarring and shaking.

Quoin-Drawer.—The drawer underneath a stone in which quoins are usually kept. The latter are bought by the hundred, thousand or bushel, and are thrown without assortment into this drawer, which is large. Six or seven sizes are enough. Here, also, are the shooting-sticks, the mallets, the planers and the proof-planers, and in some offices wooden furniture is also kept with them. This latter practice is not to be commended, as there are better places for strips of plain and beveled reglet.

Quoin-Drawer Overseer.—A name given in England to the compositor who makes up furniture and looks after the material when not in use.

Quoin Up.—To fit quoins preparatory to locking up a form.

Quotation.—An extract in a book or newspaper. When this is short it is run in, but long extracts usually make another paragraph. If there is only one quotation it begins and ends with inverted commas, which are turned commas at the beginning and apostrophes at the end, as: "Why, what's a quip?" A quotation within a quotation takes a single comma and an apostrophe, as: "The miller, holding his quarter-staff, exclaimed boastfully, 'Come on, churl, an' thou darest!'" Another quotation inside of this would take a double comma and a double apostrophe, and still another a single comma and a single apostrophe, alternating thus as long as may be required. If they close together a thin space separates each group of marks. In England it is the custom to use one comma for the first quotation, two for the second, one for the third, and so on. This is more philosophical, but is not so plain to the eye with first quotations, which constitute the great majority. In German, in the Roman character, commas are used differently. At the beginning are two ordinary commas, and at the end two inverted commas. In Waldow's Encyclopædia there is the following quotation from Timothy Alden, an inventor of a typesetting-machine: „Wenn ich am Leben bleibe, so will ich eine Maschine erfinden, welche den Setzer von seiner jetzigen grässlichen Beschäftigung erlösen soll". Nearly the same marks are used with German type, as: Das „endloſe" Papier iſt auf Cylindern ausgerollt. In French another mark is used, somewhat like two small parentheses cast together, as in the following: «Embrassez-moi, mon fils,» dit-il, et il le benit. Usually in French, when there is only a slight interruption for "said he," "he remarked," "she sighed," or "they continued," these words are run into the quoted matter, and have no quotation marks before or after, as: «Pour qui me prends-tu? lui demanda Caïus.—Pour un grand fou,» repondit l'artisan. There are two usages for the employment of the final marks of punctuation: some printers inclose the mark inside of the guillemets, others place it outside. A quotation within a quotation is shown by beginning the second quotation in the same way in which the first began, and then quoting down each line until the second quotation ends. Paragraphs

R

R THE eighteenth letter in the English alphabet, and one of the most commonly recurring, having in this respect only eight letters in advance of it, or e, t, a, i, o, n, s and h. It is thin, being usually about half way between a thick space and an en quadrat, or about two-fifths of an em. It is neither ascending nor descending. The capital is generally about two-thirds of an em in thickness. It bears no resemblance in form to the lower case letter. The ℜ bizarre is a letter found in the productions of a printer of incunabula, who is not otherwise known. R bears most analogy to l, in pronunciation, and is frequently transposed with it. As a Latin numeral it indicates 80; with a dash over it, 80,000; R, on ancient medals, signifies Ravenna, redux, regia, restitutor, Roma, Romanus; P. R., populus Romanus; R. P., respublica; R. C., Roma condita; R.M.S., Romanus; R.C., rescriptum. Among names R signified Roscius, Rubrius, Regulus, Rufus, &c. In numismatic works it signifies rare, and the different degrees of variety are indicated by one, two, three, &c. In dignities it stands for Rex or Regina, and the English monarch always adds it to his or her name, as George R. On the stage it means right; that is, the right side of the stage. Rx. is rix dollar.

Rabo (Sp.).—"Dead horse;" work paid for before it is completed.

Raboseado (Sp.).—Printed sheets which, from much handling, have been soiled.

Rack Chase.—A chase made with mortises along its inner edges, one side matching the other. Crossbars, two in number, are fitted into these receptacles, and between them a small form is placed and secured by quoins against them. By this contrivance a very small form can be securely locked up on a very large press.

Racks.—Receptacles for holding cases, boards, &c. They are upright, with strong framework, and are the width of one case. In height they may reach seven or even eight feet.

Rahme (Ger.).—The chase.

Rähmchen (Ger.).—The frisket.

Raikes, Robert, the founder of Sunday schools, was born at Gloucester, England, on September 14, 1735. His father was the publisher of the Gloucester Journal, and he was early initiated into its business. As a printer he was noted for good work. He became interested in prisoners confined in jails in the same manner as Howard. Their condition was indeed miserable. He helped them with his pen, his influence and his money. Seeing the deplorable condition of many of the children in his place, he founded a school on Sunday to teach them religion and morality, and the good consequences which soon followed caused these schools to be imitated everywhere. Others had before attempted the same thing, but there was no general extension of the system. The date assigned to this is 1781. Sunday schools were introduced into the United States about 1805, and have now extended all over the globe, doing incalculable good. Mr. Raikes succeeded his father as publisher of the Gloucester Journal, and died on April 5, 1811.

Railroading.—Marks made at the end of a series of lines by a proof-reader when he wishes a number of words or parts of words to be transposed to succeeding lines.

Railway Buff-Paper.—The English name of a common machine-made paper of buff color, very strong in texture—generally used by railway and other carriers for delivery-sheets, &c.

Railway Ticket Printing.—Although railways were in operation in the United States as early as 1830–32 it was not until 1855 that tickets bearing consecutive numbers were printed here. That safeguard had been adopted in Great Britain some time previously, and single road or local tickets with consecutive numbers had been imported by American roads. In the year named George Bailey came to this country from England, and with one or two presses to print single or "card local" tickets (the invention of John B. Edmondson, of Manchester) established himself at Buffalo, N. Y., where he made a fortune in this special business.

Early in the sixties Sanford, Harroun & Warren of Buffalo conceived the idea of applying consecutive numbers to coupon tickets—*i. e.*, tickets conveying passengers over two or more connecting roads. For this purpose Hibberd, an engineer in the United States Navy, was employed to construct a machine that would at one impression (taking the paper from a roll) print and number each ticket and cut the same laterally and longitudinally. To accomplish the automatic numbering George J. Hill of Buffalo devised the numbering wheel, which is in common use to-day, consisting of a series of disks having engraved upon their periphery the numbers 0 to 9, which, worked in unison by a series of ratchets and dogs, imprinted units, tens, hundreds and thousands, as required. So successful was the outcome of this project that the concern of Sanford, Harroun & Co. was soon after established in New York city, where they not only pushed forward the business of ticket printing, but also built and sold to others machines with which to inaugurate the business elsewhere. Thus Rand, McNally & Co. of Chicago commenced the business of ticket printing, Mr. McNally, as manager of the Chicago Tribune job office, having purchased the first machine for the Northwest.

The Liesenring Printing House (now Allen, Lane & Scott) of Philadelphia, and J. G. Wrightson of Cincinnati, each with one of these presses, commenced the business in their respective localities. From this time forward offices for this special manufacture sprang up in other parts of the country as fast as the rapid extension of the railway system created the demand, resulting in the invention of labor-saving machinery and the adoption of new ideas, permitting American concerns to compete successfully with foreign houses wherever they have come in contact.

At the present time the leading concerns in the United States are three in Chicago, one in Boston, one in New York, one in Philadelphia, one in Baltimore, and one in St. Louis.

Raine, Frederick, editor and proprietor of the German Correspondent, Baltimore, Md., was born at Minden, Prussia, on May 13, 1821. While very young he entered a printing-office at Münster. At seventeen years of age he came to America, where his father, William Raine, had preceded him, and settled in Baltimore. About 1838 William Raine had established a religious weekly, but in the heated political contest of 1840 it was changed to the Democratic Whig. It lasted only a short time; and on February 7, 1841, the younger Raine issued the first number of the German Correspondent, a small weekly. He was the exclusive editor, compositor and carrier of this journal. The next year he issued the Correspondent as a semi-weekly, and the following year as a tri-weekly. On January 5, 1844, it became a daily. The time was not yet ripe, however, and he was compelled to abandon the daily edition, but soon after revived it with success. In 1867 Mr. Raine was appointed by Governor Swann as a member of his staff, with the rank of colonel. He was an elector-at-large on the Democratic ticket in 1872, and again in 1876. In 1877 he was appointed one of the five commissioners on the system of public school education of Baltimore. In 1885 he was appointed by President Cleveland as consul-general at Berlin. After his term of office expired he returned to Baltimore and devoted himself to the business of his paper.

FREDERICK RAINE.

Wm. Pinkney Hamilton, of Howard Lockwood & Co., when nineteen years old, entered Mr. Raine's employ and remained with him four years.

Ralph.—A name given to the spirit or evil genius of a chapel. He was supposed to occasion all of the disasters of a composing-room.

Rama (Sp.).—Chase.

Ramage Press.—A press, originally entirely of wood, made by Adam Ramage of Philadelphia in the early part of this century. He was a Scotchman, who came to this country about 1795. He was the chief manufacturer of presses for many years. After a time they were constructed of wood and iron, and towards the close of his life they were made entirely of iron. Some are still in use as proof-presses.

DAVID RAMALEY.

Ramaley, David, a printer of St. Paul, Minn., was born in Pittsburgh, Pa., on August 28, 1828. He began his apprenticeship to the printing trade at the age of eleven, and was foreman on the Pittsburgh Daily Gazette at seventeen. In 1856 he removed to St. Paul, where he became at once identified with the St. Paul Pioneer and Democrat, first as foreman, then as local editor, and afterwards as business manager. In 1862 he established the first job office in St. Paul which was not connected with some newspaper. Five years later he was appointed business manager of the Minneapolis Tribune Company. He was business manager of the St. Paul Daily Dispatch for three years, and was State Printer in 1872, 1877 and 1878. For three years after 1882 he was manager of the Minnesota Type-Foundry. Since that time he has been in the printing business for himself, although giving no attention to it at present, as he has been the printing expert for the State for twelve years, this requiring his whole time. His two sons attend to the printing business. Mr. Ramaley has devoted a large part of his leisure time to the elaboration of a printers' price-list, having published a small manual in 1873, entitled the Employing Printers' Price-List of Job Printing; also a second edition in 1884. In 1888 he began the publication of the Employing Printer, intending to elaborate a complete price-list for all kinds of job printing, and at the same time furnish specimens of work from the best offices. It did not meet with sufficient encouragement to justify its continued publication, and at the end of six months was discontinued. The idea, however, was not abandoned, and Mr. Ramaley has now in press another book, the most elaborate yet attempted by any author, to furnish a series of tables for the guidance of employing printers. This book will appear in the early part of the year 1894.

Rame (Fr.).—Ream.

Ramette (Fr.).—A small chase for jobs.

Rand (Ger.).—The margin.

Random.—A special frame used by compositors in making up and for putting on standing lines and heads; a standing-galley.

Rang (Fr.).—The stand.

Range Matter.—To make lines in composing range equally at either or both ends of the stick.

Ranger (Fr.).—To put in order, to straighten.

Rasgos (Sp.).—Flourishes.

Rastall Measurement.—A plan by which the quantity of type set is measured, not by ems or ens, but by letters. The alphabet of any font is set up, omitting the z, and to this six spaces are added, or one to every four letters. One thousand letters and two hundred and forty spaces make the proposed thousand measure for that size of type. This enables the compositor to earn as much on thin fonts as on others, and the employer to pay no more on thick fonts than justice demands. It is the invention of Samuel Rastall of Chicago.

Rat.—One who works at less than the established prices. The word seems to have been long used in this connection. The analogy, of course, is with the animal which deserts a sinking ship. The term was freely used here in the first ten years of the century, and in England a hundred and fifty years ago. To labor at less than the customary wages is a necessary part of being a rat, and the belonging or not belonging to a printer's society has nothing to do with it. Rats existed before these organizations began, and to-day all of the workmen on the London Times and New York Staats-Zeitung are outside of the society, but are not rats. Their compensation is the highest in each city. Perhaps the most noted rat establishment, so called, ever in the Union was that of Gen. Duff Green in Washington about 1832. The term is one of great opprobrium.

Ratting.—Working at less than the recognized prices of a town.

Rayadora (Sp.).—Ruling-machine.

Reader.—1. The person who reads and revises proof. This is the general term used in England, but frequently he is there called corrector of the press. In this country he is generally known as a proof-reader. 2. The literary man employed by a publishing-house to read over the manuscripts submitted to it and report upon their value and availability. 3. A school-book in which reading is taught.

Reader's Marks.—The corrections and alterations —errors and deviations from copy or style—marked on a proof, and distinct from author's marks.

Reading-Boy.—The lad who reads the copy to the reader or corrector of the press. He is generally called in this country a copy-holder.

Reading-Closet.—A small compartment within the reading-room. Each reader is generally allotted a separate place in order to secure a certain amount of quietness.—*Jacobi.*

Reading for Press.—The final stage of reading preparatory to printing.

Reading-Room.—The department which includes the reading staff.—*Jacobi.*

Ream.—Twenty quires of paper, or four hundred and eighty sheets. Of late years many reams contain five hundred sheets. In England a printer's ream is five hundred and sixteen sheets.

Rebaba (Sp.).—Unevenness on letters, quadrats, &c., caused by blows or imperfect dressing.

Rebut (Fr.).—Waste-paper.

Recado (Sp.).—Savings; blank-lines, headings, &c., saved from one form or book to be used on another.

Rechnung (Ger.).—The account or stated bill of a workman.

Recipe-Mark.—A medical sign expressed thus: ℞.

Reclamo (Sp.).—Catch-word; first word of following page, formerly placed in the foot-line of the preceding page.

Reclothing Rollers.—Substituting new composition for old on the stocks. This expression is not used in the United States.

Recodo (Sp.).—Elbow or bend in the lever of a press, &c.

Record Type.—The various signs, peculiar letters and accents used in copying and printing old works with exactitude.

Recorrer (Sp.).—To overrun (matter); recorrido, matter which has been overrun.

Recorte (Sp.).—Cutting out (in making ready).

Recto.—The right side of a leaf, that having the pages 1, 3, 5, or any other odd number. It is so called in contradistinction to verso, the left-hand page, or that which contains the folios 2, 4, 6, 8, or any other even number.

Red Edge under Gold (in bookbinding).—This style of gilding is much used on the edges of Bibles, prayer-books, &c.

Red Edges (in bookbinding).—Red is much employed for coloring the edges. It was formerly most used on hymnals, prayer-books, &c.; now very frequently employed on all kinds of well-bound books.

Redacteur (masc.), **Redactrice** (fem.) (Fr.).—The editor of a newspaper, periodical or work issued in parts, &c.

Redaction (Fr.).—Editorship; the selecting and editing of literary matter for the press, or the editing of a literary work; also the place where this is done.

Redakteur (Ger.).—An editor.

Redaktion (Ger.).—Editing; also the place where this is done.

Redoblada (Sp.).—Double impression; sheet which has been printed twice.

Redondo (Sp.).—Round or Scotch faced letter.

Reed, Sir Charles, an eminent English typefounder, was the second son of the Rev. Dr. Andrew Reed. He was born at Sonning, near Reading, on June 20, 1819, receiving his education at a private school and in the London University. In 1844 he became a partner in the printing firm of Reed & Pardon, afterwards Tyler & Reed. This he left to become one of the proprietors of the Fann Street Foundry, which was begun in 1756 by Thomas Cottrell, an apprentice of the first Caslon. Afterwards it was Thorne's, then Thorowgood's, and then Besley's. Mr. Reed's purchase of the foundry was in 1862, and he carried on business as Reed & Fox in conjunction with Benjamin Fox. In 1877 Mr. Fox died, and Mr. Reed's sons, one of whom has since become celebrated by his History of English Type-Founders, were admitted to the firm. The father married in the year 1846 a daughter of Edward Baines, the editor of the Leeds Mercury; he was knighted in 1873; in 1877 he was chairman of the executive committee of the Caxton celebration, and was president of the Judges on Education at the Philadelphia Exhibition in 1876. Yale College conferred on him at this time the degree of LL.D. He died on March 25, 1881, much regretted by all who knew him.

Reel of Paper.—The paper made in continuous lengths used for web printing-machines.

Reference Marks.—Those signs which are used for foot-notes or for denoting some special fact. They consist of the star (*), dagger (†), double-dagger (‡), section mark (§), parallel (‖) and paragraph (¶). Other signs are occasionally used, as in McMaster's History. Superior letters and figures are also employed for this purpose. Reference marks are occasionally used for other objects, as in votes, when a star may indicate a Republican, a dagger a Democrat, and a double-dagger a Populist.

Refolding.—Books which have been issued in numbers require to be divided again into sheets and refolded if that has been done improperly in the first place.

Refondre (Fr.).—To recast (a roller).

Refundición (Sp.).—Recasting (of rollers, &c.).

Regal (Ger.).—The stand or frame.

Regencia (Sp.).—The foreman's or superintendent's office or closet.

Regente (Sp.).—The foreman, superintendent or manager of a printing-office.

Register.—1. The adjustment of pages so that those on the second side shall strike exactly on the back of those printed on the first side, the edges coinciding. 2. The ribbon placed in a volume for a marker. 3. A list of signatures attached to the end of early printed books for the use of the binder. 4. This word in German means the table of contents; also the register of one side of a sheet with another. Register machen, to make register.

Register-Sheet.—Sheet or sheets used to make register with.

Registre (Fr.).—Register; faire le registre, to make register.

Registro (Sp. and Ital.).—Register.

Regla (Sp.).—Any straight strip of wood or metal.

Reglet.—A thin piece of wood of an equal thickness all its length. It is quadrat high and in many dimensions, the smallest generally being pearl and the largest double great primer. Beyond this it is called furniture. The length is three feet.

Regleta (Sp.).—Lead, reglet; regleta de espada, reglet used in imposing forms.

Regletear (Sp.).—To lead or reglet matter.

Regletero (Sp.).—Lead or reglet rack.

Regulador (Sp.).—Impression-screw or regulator.

Regulus of Antimony.—Antimony in the metallic form. See ANTIMONY.

Reimpresión (Sp.).—Reprinting.

Réimpression (Fr.).—A reprint.

Reins, David H., of New York, the founder of the Typographical Society of that city, was born at Newburgh, N. Y., on January 16, 1783. He was indentured on December 29, 1795, to Jacob S. Mott, a printer of New York. He accompanied his employer to Nova Scotia two years after, but returned in 1800. For a short time he was at sea, but finished his apprenticeship with G. & R. Waite, with whom he was afterwards foreman. He served during the war of 1812 as a volunteer. In 1832 he removed to Ithaca, where he took charge of the office of Mack & Andrews. On his return after four years' sojourn he became foreman for David Felt, the manufacturing stationer. In 1809 a little gathering of printers was held at his residence, No. 49 Barclay street, at which the advisability of forming a printers' society was discussed. The first formal meeting was held on July 4 of that year, when the society began its operations. Mr. Reins was secretary. Its benevolent work still continues after eighty-four years. He remained a member till his death, at West Farms, Westchester County, on March 23, 1862. He had several times been president. On the fiftieth anniversary of the foundation of the society he sat for his portrait, which still graces its rooms. He remained a working printer till infirmity compelled his withdrawal. When he began there were probably no more than fifty journeymen printers in New York; at his death there were three thousand.

Reiteration.—The second form or the form printed on the back of a sheet already partly printed. This word is now very little used.

Relever (Fr.).—To lift out.

Relief Printing.—Letter-press printing and xylography come under the head of relief printing, in contradistinction to plate printing, which is from intaglios, and from lithography, which is chemical printing.

Relieur (Fr.).—Bookbinder.

Relieve (Sp.).—The projection formed by the face of a letter.

Religious Marks.—Signs such as: ✠, ℟, ℣.

Remanier (Fr.).—To run over matter in correcting.

Remetido (Sp.).—Inserted; sheets printed to insert in another.

Remiendo (Sp.).—Job; any separate piece of work, not forming the body of a book.

Remosquear (Sp.).—To slur, to offset.

Remosqueo (Sp.).—Slur, offset.

Renewing Rollers.—When rollers are worn out the stocks are reclothed or renewed with composition. These are English phrases; in America it is said rollers are recast.

Renglón (Sp.).—Line.

Renverser (Fr.).—To overturn.

Renvoi (Fr.).—A reference-mark.

Repartido (Sp.).—Division, portion.

Repartir (Sp.).—To divide or apportion letter or copy among compositors; repartir la tinta, to distribute the ink.

Repasar (Sp.).—To revise, to go over a second time.

Repasting.—To put paste on a certain place a second or third time.

Repetido (Sp.).—A doublet (repeated word).

Repintar (Sp.).—To offset.

Reprint.—A second or new impression or edition of any printed work; the publication in one country of a work previously printed in another. In the printing trade a printed article cut from one paper and reproduced in another is called reprint copy, as distinguished from manuscript or written copy. Reprint is more easily composed than manuscript, and is more profitable alike to the journeyman, the employer and the publisher. The latter is able to estimate exactly the size and cost of the work which he proposes to issue; the employer gets a much quicker return of the matter which he sets up, and the journeyman has better proofs and less loss of time on his copy. Nearly all scales make a difference between manuscript and reprint copy, but this variation is rarely enough. By the New York scale there is now a difference of three cents a thousand, the two rates being forty-three and forty on solid; but judging by the lessening of performance the rates should be as wide apart as forty-five and thirty-eight. Reprint much altered is estimated as manuscript.

Remainder.—That part of an edition which is unsalable at the rates first put upon it and remains in the publishing house. It must be sold, if at all, at much lower prices. Sometimes a work is superseded by no fault of its own by one from a rival house, which is fresher and perhaps better; sometimes its place is taken by a later and better edition of the same work, as the eighth edition of the Encyclopædia Britannica was by the ninth edition. Sometimes a good book falls flat and very few copies are sold. These remainders are disposed of at very low prices to booksellers who have such a trade that they can dispose of them. If bought in sheets they are often given new titles and new bindings, so as to increase their chances of sale.

Reporter.—One who gathers up news for a newspaper. If he does this in such a way as to be paid for the quantity he furnishes, he is a space reporter. Every daily newspaper employs many reporters, the larger New York papers not having much less than a hundred. Many are assigned to particular places or duties, one, for instance, covering the courts, another the coroner's office, another the Produce and Cotton Exchanges, and another police headquarters; but many are sent out on particular errands. They cover lectures, meetings, accidents, fires, mobs and all the occurrences of a great community. When the matter is important, as, for instance, a great explosion, with the loss of many lives, one or two dozen reporters may be employed on that alone. Few American reporters are good shorthand-writers; almost all depend upon longhand notes and their memory for the reproduction of the most important events. Traveling and hotel expenses are paid for those who are sent away from home.

A frequent subject of discussion among literary men has been the advisability of teaching shorthand so that the compositors can set up notes without waiting to have them translated into longhand. This would be an admirable thing if it would only work. Unfortunately few reporters follow a system in its entirety, each having some private marks of his own; the number of lines or strokes are far less for a word, diminishing the legibility to the compositor and often making it very difficult to the reporter himself; and these notes nearly always need changing in order to give greater smoothness to the language. Few reporters for newspapers take more than three-quarters of what is said, and many not over half, and in omitting and condensing they are liable to make errors, which can be discovered if the writer himself revises, but which the printer knows nothing about.

Reserva, Letra de (Sp.).—Letter or type laid away, as not being required for the work in progress.

Resma (Sp.).—Ream.

Response.—A sign used in prayer-books and other religious works, and expressed thus: ℟.

Responsorio (Sp.).—The sign ℟ (response).

Ret.—An abbreviation used in London by pressmen to describe the second side of a sheet. It is formed from reiteration.

Retiración (Sp.).—The second form or second side of a sheet in printing.

Retirar (Sp.).—To print the second side of a sheet.

Retiration (Fr.).—The reiteration; the second side in printing.

Retire, se (Fr.).—Shrinks.

Retouch.—To retouch a plate is to go over it with a graver and deepen the lines which have become worn. This cannot be well done on a wood-engraving.

Retree.—The outside, rejected or damaged paper of different reams, marked thus × × in invoicing.

Retropagina (Ital.).—The run-over.

Revans, Samuel, the oldest journalist in Australasia, died at Greytown North, Wellington, on July 14, 1888, aged eighty. He was a Canadian by birth. In 1840 he landed near Wellington with a hand-press and type and brought out the Gazette. Afterwards he was a sheep farmer and a member of the Provincial Council.

Revidieren (Ger.).—To revise.

Revisar (Sp.).—To revise.

Revise.—A second or subsequent proof. This is usually read in offices of any size by another proof-reader than the first. The copy comes to him with the first proof and the fresh revise. He marks upon the latter when he has finished it the letter R, and when there are many readers his name and the time. If the revise is to go out to the author the proof-reader first looks over the corrections which were marked for the preceding proof and sees whether they were properly executed. Those which are defective or wrong he marks again, places at the head of the proof A. R. (author's revise), with the date and hour, and sends it out by mail or messenger. He has carefully copied the marks he has placed on the author's revise upon the revise which he retains, and then proceeds to read the whole proof carefully. If it has been very bad he should call to his assistance one of the copy-holders and have it read again by copy; but ordinarily this is unnecessary if the first reader is practiced. It is well, however, to do this occasionally when a new and untried man is employed. The reviser carefully reads the whole, marking bad letters, erroneous punctuation and wrong division. He must also consider the sense, and wherever anything appears which he judges to be wrong he should query it. It is no disparagement to a first reader who has had a bad proof before him to say that he has not found all of the errors; but it is a serious thing for the reviser to have even one wrong letter or one turned letter in a volume. On books of learning proofs are read more than twice, and in some offices all proofs are read three times. Generally speaking, if a proof or revise has as many as twenty errors marked in it another proof should be taken and read. See under head of PROOF.

Reviser.—The reader who revises proofs; in French, to revise.

Reviseur (Fr.).—The reviser.

Révision (Fr.).—Revision.

Revisionsbogen (Ger.).—The revise.

Revisor (Sp.).—Reviser.

Revoir (Fr.).—To look over, to revise.

Rhode Island.—The first press in the colony was set up in 1732 at Newport by James Franklin, the brother of Benjamin, who, however, soon died, and was succeeded by his wife, Anne Franklin. She was assisted by her two daughters, who were correct and quick compositors. Her son, James Franklin, Jr., became his mother's partner as soon as he was of age. He died in 1762, when his mother formed a partnership with Samuel Hall. She died in 1763. Hall sold out in 1768 to Solomon Southwick, who became very obnoxious to the British during the Revolutionary War, and was obliged to seek a place of safety. At the close of the struggle he returned. Printing began in Providence in 1762, William Goddard being the first workman. The total number of newspapers and periodicals published in 1810 was 7; in 1840, 16; 1850, 19; 1860, 26; 1870, 32; 1880, 44; 1893, 83. The publications in 1880 were 8 daily and 36 other periodicals; in 1893, 15 daily and 68 other periodicals. Job printing is largely carried on in Providence, which is the only important place.

Richiamo (Ital.).—The mark in the copy indicating the end of the signature.

Richardson, Samuel, the novelist, was a master printer in the city of London. He was born in 1689, in Derbyshire. His father, who was a carpenter and joiner, had intended to send him to school and fit him for a position in the Church, but his circumstances forbade, and Samuel was therefore apprenticed in 1706 to John Wilde of London, but soon found that he had a harsh and unfeeling master. His only opportunity for self-instruction was at night. After serving out his time he was employed for six years as a compositor and proof-reader in the same house; then entering into business for himself, he filled up his leisure hours by compiling indexes for the booksellers and by writing prefaces and "honest dedications." He printed six numbers of the Duke of Wharton's True Briton, but becoming convinced that they were libellous he declined doing other numbers. In this resolution he was fortunate, for four of them were deemed libels, and Mr. Payne, the publisher, was found guilty of an infraction of the law. Richardson's name did not appear on the sheets, and he escaped. The Speaker of the House of Commons, Mr. Onslow, shortly after secured to him the printing of the Journals of the House of Commons, and under his management they reached twenty-six folio volumes. He obtained from these a profit of upwards of three thousand pounds. In 1760 he purchased half of the patent of King's Printer. In 1754 he was elected to the post of Master of the Stationers' Company. In 1889 a mural brass tablet was erected in his honor in the building of this organization. His business was large and his efforts did not cease after he became a successful novelist. When a boy in school he had been distinguished for his powers as a narrator. "As a bashful and not forward boy," he says, "I was an early favorite with all the young women of taste and reading in the neighborhood. Half a dozen of them, when met to work with their needles, used, when they got a book they liked and thought I should, to borrow me to read to them, their mothers sometimes with them; and both mothers and daughters used to be pleased with the observations they put me upon making. I was not more than thirteen when three of these young women, unknown to each other, having a high opinion of my taciturnity, revealed to me their love secrets in order to induce me to give them copies to write after, or to correct, for answers to their lovers' letters; nor did any one ever know that I was the secretary to the others." This was an employment well suited to nourish and strengthen Richardson's wonderful faculty of entering into the feelings of other hearts and giving them true and natural expression. He first became an author in 1740, when the first part of the story Pamela was issued, the second part following soon after. Its simplicity and closeness to nature at once made the book popular, and it retained its hold upon the public for generations. The first part of Clarissa Harlowe appeared in 1748, and the History of Sir Charles Grandison was printed in 1753.

SAMUEL RICHARDSON.

By this time his reputation was very high. For fifty years his name was bracketed with those of Fielding and Smollett, the great English novelists, and his fame extended to all European countries. His works are not now read. He suffered the fate of being burlesqued and caricatured, and sheets of his novels were stolen from his printing-office as fast as they were worked off, the works being reprinted in Dublin and other towns with forged imprints, very much to his pecuniary injury. He died on July 4, 1761, and was buried in London. His character was exemplary, and he gave away much in charity.

Richmond.—Richmond, Va., has been an important centre for newspapers for many years. The first one founded there was in 1804, by Thomas Ritchie. During the Civil War Richmond was the capital of the Confederacy. There are now published there 5 daily newspapers and 40 other periodicals. There are several important job offices.

Rider.—An insertion in proof of additional manuscript, marked to come in at a certain place.

Riding.—1. When a lead at the end of a line allows a letter to slip partly by, then catching it, it is said to ride. 2. When one color, which is next to another and should be entirely separate from it, falls upon it, more or less.

Ridley Press.—A press invented by Joseph Ridley in 1795 which received a premium of forty guineas from the Society for the Encouragement of Arts.

Ries (Ger.).—A ream.

Rifare, Trasportare (Ital.).—To transpose from one line to another.

Righe (Ital.).—Lines. Riga piena is a full line; riga bianca a blank-line; riga perduta, literally a lost line, a line between two blanks; riga punteggiata, when leaders are inserted; riga di testa, head-line; riga del piede, foot line.

Righino (Ital.).—The last line of a paragraph, which cannot begin a page.

Right-Hand Pages.—Those pages with odd folios, as 1, 3, 5, 7, &c. A right-hand page is also called a recto.

Riley's Indispensable.—A fluid preparation used twenty years since as a drier and varnish for thinning ink when work was needed at once.

Ring-Mark.—In correcting proof those alterations which are changes from the original copy furnished by the author are marked by drawing a ring around them, and for these special payment is required by the compositor.

Ringwalt, John Luther, writer of an encyclopædia of printing, was born in Lancaster, Pa., on October 16, 1828. After receiving a common school education he was apprenticed to a printer in West Chester, Pa. At seventeen years of age he became editor of the Monroe Democrat at Stroudsburg, in the same State; subsequently removing to Philadelphia, he contributed to the editorial columns of the Pennsylvanian, and acted as managing editor of Colonel Forney's Press for a number of years. He was also a partner in the firm of Ringwalt & Brown, job printers. In 1871, in conjunction with R. S. Menamin of Philadelphia, he published the American Encyclopædia of Printing, a large and valuable work. In this he had the assistance of many other persons, much being written by his wife, Mrs. Jessie E. Ringwalt. During his long journalistic life he contributed extensively to the Record, Inquirer and Evening Telegraph. As an authority upon subjects which he had so deeply studied, Mr. Ringwalt was frequently called upon to lecture upon the history of printing and upon the press. At the time of his death, which happened on July 29, 1891, he was editor of the Railway World, a post which he had held for more than fifteen years.

Rinsing-Trough.—The trough in which forms are washed.

Rio de Janeiro.—This city, the largest and wealthiest in South America, now publishes many daily and weekly journals, some of the former being very large. Printing began there in 1818. Nearly everything in the way of printing material and supplies is imported. There is no type-foundry and no printing-press manufactory.

Riscontro (Ital.).—The revised proof-sheet.

Rise.—1. A form is said to rise when it springs through bad locking up and the type gets off its feet. 2. The term is also used when quadrats and furniture black in printing through imperfect justification. 3. A form is said to rise when, on being lifted, no letters drop out.

Risers.—Wooden or metal blocks for mounting stereotype and electrotype plates.

Risley & Lake Machine.—A contrivance by which a series of dies are assembled by means of a keyboard, justified by the use of a revolving wheel, and stamped into a paper matrix. This ingenious machine has not yet been put upon the market, nor are accurate descriptions available.

Ritchie, Millar, a native of Scotland, who began business in 1785, and was the first after Baskerville to give an impulse to the printer's art in Great Britain. The Rev. Mr. Homer, the senior fellow of Magdalen College, Cambridge, provided Ritchie with means to print a set of six of the leading Latin authors, including Sallust, Tacitus and Livy, which were done in a very superior style. The size was royal octavo. A Bible in two volumes, folio, was the next work. This was also well executed, and another done with splendor was the Memoirs of the Count de Grammont. Ritchie found much difficulty in getting his work executed to his satisfaction and was obliged to beat every form himself. His workmen could not understand the necessity or were unwilling to spend the time he required. He failed in business, and in his old age was employed by Thomas Curson Hansard in his warehouse.

Rivière, Robert, a bookbinder of London, who was a descendant of an old Huguenot family which settled in England two centuries ago. He was apprenticed to the bookbinding trade with Messrs. Allman in London, and after becoming a journeyman began business for himself in Bath. In 1830 he returned to London, where he soon secured a reputation for careful and conscientious work, much of the very best being intrusted to his care. He died in 1882.

Rivington, James, a printer of New York, was an Englishman by birth. He had been a successful printer and bookseller with his brother John in London, where he made about ten thousand pounds. After losing most of this through a love for horses and horse-racing he came to America in 1760, settling first in Philadelphia as a bookseller, and afterwards in New York as a printer. In the latter city he founded in 1762 the Gazetteer. It was a zealous Royalist organ, and had its office twice mobbed for its zeal, once by the Sons of Liberty and once by a party of Connecticut militia. After this Rivington went to London and procured a new outfit, with the title of King's Printer. Upon his return he distinguished himself by the zeal with which he advocated the British side. In his journal the latest intelligence was published, together with everything which in his mind or that of the commander-in-chief would give courage to the Tories. It was issued semi-weekly. When the war ended his newspaper was abandoned, but he continued to live quietly in New York as a bookseller, stationer and tobacconist. It has lately often been stated that he owed his exemption from molestation to the favor of General Washington, who gave orders that he should not be disturbed, as he had been during the war Washington's most valuable spy. His easy manner, his former connections in Great Britain, his present ardor in the conflict, all would conspire to give him the intelligence he wished almost as soon as Sir Guy Carleton or the other British generals. It is certain that some one high in favor revealed the secrets of the English camp regularly and habitually to the Americans. Mr. Rivington finally failed as a stationer and retired. He died in July, 1802, aged seventy-eight.

Rivoltare (Ital.).—To take out letters which have been turned for sorts and to put in the right ones.

Roan or Colored Skiver.—This is made of the inside half of a split sheep-skin. It is extensively used for binding large editions of the higher grades of school-books, &c., a roan back, cloth sides, with marbled edges, being the style generally used in all duodecimos of this class. It looks well, and is not costly.

Rochester.—A city situated in Western New York which does a great variety of printing. Settlement began there in 1813. The first newspaper was got out by A. G. Dauby, and was called the Rochester Gazette. The first daily newspaper published west of tide-water was at Rochester in 1826, when the Advertiser was begun. Its publication is still continued. In 1832 there were only seven daily papers printed in the State of New York outside of the city of New York, two of which were in Rochester. There are now issued there 7 daily and 32 other periodicals. There are a number of job offices.

Rociar (Sp.).—To dampen the edges of the paper or the tympan.

Rocking Proof-Planer.—A proof-planer which does not depend upon percussion for its use, but upon a rocking motion. The planer is a section of a circle, and the power of the hand and the arm gives it enough pressure for a few lines at once, the rocking carrying the proof still farther.

Rockwell, Horace Tyler, a printer of Boston, was born at Winchester, Conn., on August 17, 1838. He was educated chiefly under the tutorship of his father, who was the principal of the academy at Winchester, afterwards a stenographic reporter, and subsequently interested in newspaper enterprises in Boston. In that city Horace T. Rockwell has lived since 1854. He early acquired the art of stenography, and became attached to the Boston Daily Advertiser as a reporter in the year just mentioned. On that paper and the Daily Courier he continued until 1859, when he took an official position under the City Council. This he resigned in 1866 to engage in business as an employing printer. While employed upon newspapers he had learned the case, and frequently was called upon to set type. His habits of assiduity and painstaking, and his natural insight into business, enabled him to overcome the obstacles which his limited knowledge of typography occasioned at first. Few have now a better acquaintance with the intricacies of the art. His first partner was A. P. Rollins, but before the year had expired Gardner A. Churchill was admitted to the firm. Upon the death of Mr. Rollins in 1868 the firm became Rockwell & Churchill, and it so continues. It now gives employment to over two hundred persons and turns out excellent work. Colonel Rockwell has served in the City Council of Boston and the Legislature of Massachusetts; he held under three different governors an important position upon their staff, his service covering some years of time; and he was for three years chairman of the Water Commission of the city. He was secretary of the New England Franklin Club, the association of employing printers of Boston and vicinity formed during the war, and when in 1885 a new organization was formed under the name of the Boston Master Printers' Club he was chosen president, holding the office for three years. He was one of the delegates to the original convention which formed the United Typothetæ of America in 1887, and took an active part in its deliberations. In 1890 he was chosen president of that body. He is a good speaker and an excellent parliamentarian, and his administration of this important office was distinguished by marked ability.

HORACE TYLER ROCKWELL.

Rodajas (Sp.).—Pulleys or small wheels collectively.

Rodete (Sp.).—A cylinder to which are attached the straps which move the bed of a hand-press.

Rodillo (Sp.).—Roller; rodillo caballero, riding or distributing roller.

Rogers, Gamaliel, a printer of Boston, served his time with Bartholomew Green the elder, and began business about 1729. In 1742 he formed a partnership with Daniel Fowle, as Rogers & Fowle. They did good work and had a large business. In 1743 they issued the American Magazine, the first brought forth in Boston, and for two years carried on a newspaper. They printed a Testament for D. Henchman, the first in the country. This was kept concealed, as there was a penalty against printing Bibles or Testaments They were the only printers in America who knew how to make good ink. After the dissolution of partnership Rogers removed to a new location, and was shortly after burned out. He could do no more business as a printer, but opened a small grocery. He left Boston when it was besieged in 1775, sought an asylum at Ipswich, and died there the same year. He was seventy years old.

Rogers, John K., a type-founder of Boston, was born at Gloucester, Mass., on January 31, 1821. He entered the Boston Type-Foundry, of which his uncle, Gorham Rogers, was then the agent, while still very young. He afterwards became a partner, and when the business was reorganized in 1871 he owned the controlling interest. He was a member of many societies devoted to art and literature, and was for many years treasurer of the Boston Art Club. He died on January 27, 1888.

Roll.—To calender or glaze paper or printed work.

Rolled Paper.—The class of paper glazed or calendered for cut-work, &c.

Roller.—A composition-roller is a compound of glue and molasses or glycerine, cast in a cylindrical form and used to apply ink to type or wood-cuts. The mixture was unknown in the early ages of printing, and all ink was applied by stuffed balls with a covering of skins. When the machine-press was invented it was found necessary to use something having another shape for this purpose, and long leathern cylinders were employed. The seam, however, always showed, and a fortunate discovery made some years before was taken advantage of to furnish a better material. A compound of glue and molasses had been used in the pottery works in Staffordshire; this was both elastic and firm. Two persons seemed to have observed its fine qualities and to have thought that it would be possible to obtain good results from it on a printing-press. They were Forster, at Weybridge, and Harrild, at London. They spread it in a melted state upon canvas, making balls from it, which answered the purpose admirably. The makers of printing-machines as soon as they heard of its use applied it to cover the inking cylinders, which had been previously covered with leather. The discovery that composition could be used for balls was not far from the year 1810; but in spite of its superiority it was many years before pelt balls were driven out, and longer yet before rollers were universally used. Up to 1835 every apprentice and journeyman in England learned the use of balls, and they were somewhat employed for twenty years later. Forster and Harrild each embarked in the making of rollers as soon as they saw that there was a demand for them, and their manufacture became a separate business. The honor of introducing rollers into the United States is contested by several men in New York city, including Daniel Fanshaw, Samuel Bingham, James Booth and a Canadian named Spence. The last named made rollers for the trade. Rollers were unknown there in 1824, as appears by a statement of the late William C. Martin, but in 1826 Mr. Booth's account-book shows that he had a roller-mold and bought both glue and molasses. The inference, of course, would be that he also made rollers. Until 1842 no press had more than two form-rollers, but soon after this the Adams press was so constructed as to employ four or six when necessary.

The original mixture was of glue, molasses and plaster-of-paris. The quantities differed according to the whims of the makers. The glue was cut up into small bits and soaked. It was then melted in a kettle at a temperature not above that of boiling water. When dissolved the molasses was mixed in and the whole was kept at a boiling heat for an hour. Then the white powder, made of the pulverized plaster, was mixed in. In another hour it was ready to pour off into the mold made of two brass semi-circles joining closely.

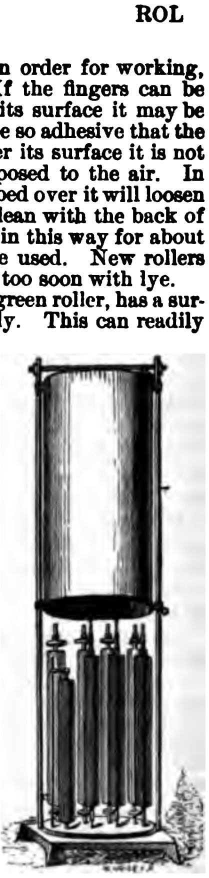
Experience very soon showed that plaster-of-paris was unnecessary. As rollers are at present made by printers glue, molasses and glycerine are used. The latter is thought not to make quite as good a roller as molasses, but it keeps longer and stands hard usage better. The glue is put in a bucket or pan and covered with water. It is next left to stand until it becomes more than half penetrated with water, care being taken that it shall not soak too long; it is then poured off and left until it becomes soft, when it is ready for the melting-kettle, which is a double vessel. The outer kettle is partly filled with water, and the other kettle is set inside of it. No matter how great a heat is applied the water in the outer kettle cannot rise higher than the boiling temperature, and, of course, whatever is in the inner kettle is not in danger of burning. The glue is put into the inside kettle. When it is entirely melted the molasses is slowly poured into it, and is well mixed with the glue by frequent stirring. When properly prepared the composition does not require boiling more than an hour. Too much boiling candies the molasses. In proportioning the material much depends upon the matter and temperature of the place in which the rollers are to be used. Eight pounds of glue to one gallon of molasses or syrup is a very good proportion for summer, says one authority, and four pounds of glue to one gallon of molasses for winter use. Hand-presses require less glue and more molasses than machine-presses.

Before pouring a roller the mold is made perfectly clean and is well oiled with a swab, but not to excess, as too much oil will make the surface of the roller seamy and ragged. The end pieces are then oiled, and together with the core are placed in the mold, the upper end piece being very open to permit the composition to pass down between the interior of the mold and the cylinder. The cylinder is well secured from rising before the composition is poured in by placing upon the end of it a stick sufficiently long to reach above the end of the mold and to be tied down with twine. The composition is poured very slowly and in such a manner as to cause it to run down on only one side of the cylinder, allowing the air to escape freely up the other. If the mold is filled at night the roller is drawn the next morning; but it cannot be used for at least twenty-four hours after, except in very cold weather.

To determine when a roller is in order for working, press the hand gently upon it. If the fingers can be drawn lightly and smoothly over its surface it may be said to be in order; but should it be so adhesive that the fingers will not glide smoothly over its surface it is not sufficiently dry, and should be exposed to the air. In cleaning a new roller a little oil rubbed over it will loosen the ink, and it should be scraped clean with the back of a case-knife. It should be cleaned in this way for about a week before other detergents are used. New rollers are often spoiled by washing them too soon with lye.

A new roller, sometimes called a green roller, has a surplus of moisture on its surface only. This can readily be dried out and brought into perfect working order by blowing a blast of warm, dry air over it. This can be done by placing the rollers in a box and blowing the air through.

The processes in the roller factories, while substantially similar to those described above, are kept secret. Much more of glycerine than molasses is now used in these factories, and the rollers which they turn out are much better than those which ordinary printers can make. A recent improvement is one by which the composition is forced up from the bottom of the mold, thus avoiding bubbles. Several rollers are also cast at once.


ROLLER-CLOSET.

Rollers are usually kept in boxes or closets, both to prevent dust and dirt from getting on them and to keep them in condition. They must also be guarded against mice. It is usual to wash them at the conclusion of each job, and also once or twice a day. Each time that they are washed a portion of the molasses or glycerine is also washed out, and the roller after many washings becomes hard and glassy, only the glue being upon the surface. It therefore seems to be the better practice to wash them only when they are dirty. If they have nothing upon them except ink they will do better to retain it. The temperature of a pressroom should be very even. Composition will not work well either in very hot or very cold rooms. The annexed cut shows a German contrivance for a roller-closet, a metal cover coming down over the top.

Roller-Box.—The receptacle in which rollers are kept to protect them from dust, &c.

Roller-Boy.—A boy whose business it is to distribute and roll the ink upon a hand-press.

Roller-Composition.—The material from which rollers are made, consisting of glue, molasses or glycerine, so compounded and melted together that they form a solid but tender mass.

Roller-Cupboard.—A cupboard in which rollers are stored to protect them from heat and dust.

Roller-Fork.—The contrivance which holds the roller when working in a printing-machine.

Roller-Frame.—The iron frame into which press-rollers are fitted.

Roller-Knife.—An implement used for scraping off the old ink when the roller is required for use.

Roller-Mold.—A long, hollow tube into which the roller-composition is poured or forced after the core has been inserted. Originally molds were made of brass and tin in two pieces, joining their entire length; then the tube was bored out of solid metal; now, however, it is generally made of brass tubing. It must be very smooth and regular.

Roller-Racks. — Receptacles for storing rollers when not in use.

Roller-Sockets.—The open part of the roller-fork in which the spindle rests.

Roller-Spindle.—The iron rod on which rollers revolve on the frame or forks.

Roller-Stocks.—The core of a composition-roller.

Roller-Stop.—A contrivance on a printing-machine for stopping or fixing rollers while the press is in motion.

Roller-Throw-Off.—An appliance for stopping or throwing off rollers while a machine is running.

Roller-Washing.—The act of cleansing rollers.

Roller-Wheel.—The wheels on which the rollers revolve in a printing-machine.

Rolling-Machine.—A machine introduced to save the labor of beating, the sheets being passed between two revolving cylinders under great pressure.

Rolling-Press.—The press used by copperplate and steel-plate printers, so called because the plate is rolled through it to take an impression.

Rolls.—Cylindrical ornamental tools used in finishing in bookbinding.

Roman.—The kind of type used in printing in England and America, as well as in all the countries which derive their languages from the Latin. This term is used in contradistinction from the Greek, with which it has many letters in common; from Italic, a species of Roman, which is an inclined type, while the strict Roman is upright; and from German or black-letter, which is more formal, more angular, and has more heavy lines. The German printers imitated the handwriting of the best scribes of their country, but the standards of Italy were very different from theirs. When, therefore, the art invaded that country, as it did very soon, a revision of the faces was necessary. The earliest book in the new character seems to have been either the Cicero de Oratore of 1465 or the Lactantius of the same date; but those who printed them seemed to have been unable to shake off German influences entirely, and it was not until Nicholas Jenson, a Frenchman, printed his Eusebii Præparatio at Venice in 1470 that the true Roman character appeared. The size was English, and there were in all seventy-three punches. A semi-Roman type was also used at Wiedenbach, near Cologne, in the same year. This book is known as the one with the R bizarre, from a very peculiar letter used in it. In 1473 Mentelin of Strasbourg adopted this form, but it did not receive acceptance in Germany generally. In France both the Gothic and Roman forms struggled together when printing was first introduced, but in the end the latter was triumphant. Since the year 1500 very few books have been published in black-letter in Italy, France or Spain, and these mostly for books of elegance. In Holland black-letter was largely retained until the seventeenth century, and in some classes of work until very lately. The original face in England was also black-letter. All of Caxton's type was Gothic, and so were the characters of his immediate successors. The first appearance of Roman in England was in 1518. Day began using it for general work, and by 1600 most printing was executed in the newer character. During the seventeenth century the style of English typography declined, and the cut of Roman was exceedingly bad. The first English Bible in Roman type was Bassendyne's edition in Edinburgh in 1576. The use of this style was so firmly established in 1639, when the first printing-office in the United States began, that black-letter was not required, except as a display type. Roman is now used in Germany considerably, especially on scientific and learned works; and it is also used in the Scandinavian countries, some works being published in it and others in black-letter. In Holland and Belgium it comprises everything except a few religious works. Polish, Hungarian and Bohemian employ this character, and it is the only letter used in Europe, except as mentioned above, and the Russian, Turkish and Greek languages. In English there are twenty-six letters, but some languages have no more than sixteen, while others have thirty-two or thirty-three. The additional characters are nearly always modifications of the others by accents or subsidiary marks. Only Roman and German are employed in the New World. Roman is used in Asia and Africa by some languages. Nothing else is employed in Polynesia.

The essential feature of Roman is its plainness of character. Very few letters are complex; few are liable to be mistaken for each other; the angularity is slight and the character is very readable. As made by type-founders several things are added which are not essential to it. There are serifs and finials; some lines are thickened and others are made thin. Originally, however, the letters were even in line, like those we now know as Inscription Greek. The greater weight of some lines and the lessened weight of others arose from the desire of the calligraphists to vary their work and add to its beauty. The rules adopted in the Middle Ages have descended to us, and consequently all letters are now made with variations and with endings.

Four forms of Roman are now used in printing-offices. The Italic, which first made its appearance in 1501, was an attempt by the eminent Venetian printer Aldus to produce a letter which should give more compression and more variety. Together with the upright Roman it has been used ever since, but in decreasing proportion, until now one-twentieth of the whole font is thought enough, while two hundred years ago one-fifth was required. The faces were altered in succeeding ages, but were all gradually changed to new style. This innovation began to be used in an edition of the British Theatre about 1795. Each printing-office bought the newer face as its stock required replenishing, until in 1810 little was printed with the older form. By 1825 it had become extinct. The Caslon face of old style was revived forty years ago and became popular. All printing-offices are now compelled to keep it, more or less modified, in stock, as well as new style. Ten years since a still older form, generally known as the Elzevir, was resurrected and has been much used as a display letter. Few whole books have been printed in it. The same changes have taken place in France. The desirable face there now for ordinary work is one in which the serifs are very small and the distinction between the light and heavy lines is very little. Motteroz, a celebrated printer of Paris, has devised a face rounder and clearer than was before known in France, which unites with beauty great legibility. Ornamental type is a variation on Roman, being made thinner, thicker, wider or narrower, or having some other modification, but not enough to prevent the letter from being read.

In Germany Roman is called Antiqua, the black-letter being known as Fraktur. The Dutch, French and English called it Roman from the first. In Italian it is called rotondo.

Roman Numerals.—Letters, instead of Arabic figures, employed for numbers. The first part of a book, including its introduction and preface, is very generally numbered with Roman letters, leaving the figures 1, 2, 3, and so on to begin with the body of the work.

Romano (Ital.).—Capitals.

Rome.—The capital of Italy. It was one of the first places where printing was practiced. Conrad Sweinheym and Arnold Pannartz, who had previously printed at the monastery of Subiaco, near Rome, removed to that city in 1467. They executed many large works. Ulrich Hahn began work in Rome the same year. Those who practiced the art multiplied, and before the year 1500 there were or had been thirty-seven master printers at

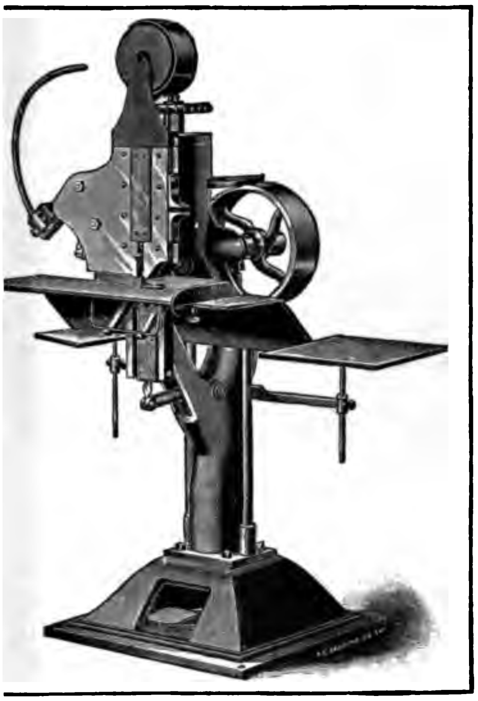
Since that time the printing-office of the Pro- la has had a high reputation, as its collection of ı foreign languages is almost unequaled. A num- daily and weekly periodicals are now printed in and some excellent books.

da (Sp.).—Face of letter similar to round or face.

a (Sp.).—The clothing of the cylinder; that is, nket and sheets with which a cylinder is covered.

e-Paper.—Strong packing-paper of various ıade largely from the fibre of old rope.

back Automatic Wire-Stitcher.—A ma- or stitching books, using wire instead of thread. invented and patented by Frederick P. Rosback ago in 1890. The chief and most important feat- this machine is its automatic adjustment. The g portion of the machine is raised and lowered



ROSBACK'S AUTOMATIC WIRE-STITCHER.

onveniently located hand-wheel, and has a recipro- arrangement by which the length of staple is auto- lly adjusted to the thickness of the work, whether single sheet or a book an inch in thickness. To te this adjustment to the simplest degree a gauge ed upon the right-hand side of the machine direct- ront of the operator. The hand-wheel is turned ıe gauge fits with gentle pressure the work to be d, when the machine is ready for operation.

in.—Resin as employed in a solid state for ordi- urposes. It is obtained from turpentine by distil- It forms one of the chief bases of printer's ink.

ary-Gatherer.—A revolving circular-table for ing sheets into books. This ingenious invention, little over ten years old, has been of great value in nding, as books are gathered by it much more ex- usly and easily than before. The various signa- f a book are laid upon the edges of this rotating As it turns on its axis each heap passes in suc- before a number of girls, who are seated by its These young women take one sheet from each pile in turn, and each revolution gives a complete book for each operator. There is neither confusion nor trouble.

Rotary-Machine.—A press in which the cylinder carrying the form is continually rotating, each turn printing a copy or copies of a newspaper. See TYPE-REVOLVING PRESSES and WEB PRESSES.

Rotondo (Ital.).—The Roman character; German, Antiqua.

Rotten.—Rottenness is the name given to prints from wood-cuts or electrotypes in which shade lines are weak, broken and full of holes. It is usually caused by feebleness of impression on cuts that have been badly molded in the wax and not fairly flattened in finishing. Rough paper often produces the same result. A cut that has been scratched or battered usually shows a clean, sharp, distinct edge at the break. Rottenness, on the contrary, always shows misty and uncertain outlines.

Rough Proof.—A proof taken quickly, without pains.

Rouleau (Fr.).—Roller.

Roulette.—An ornamentation in binding, formed by the impression of a wheel-like tool, the revolutions of which form the pattern.

Rounce.—The handle by means of which the press-carriage is run in and out.

Rounds, Sterling P., late Government Printer, was born in Berkshire, Franklin County, Vt., on June 27, 1828. He began his apprenticeship in Southport, now Kenosha, Wis., during the last year being foreman. He then became foreman of the State Printing-Office at Madison, and was employed in this and other positions similar to it until he removed to Chicago in 1851. Some time after this he began the printers' furnishing business, and while he continued in it fitted out four thousand offices. In 1856 he added the first electrotype foundry in Chicago. In 1871 he was burned out in the great fire, losing his entire equipment, which then included also a bookbindery. He was appointed Public Printer in 1881, and after serving four years removed to Omaha, purchasing the Omaha Republican. He died shortly after, on December 17, 1887.

Rousseur (Fr.).—Reddishness; foxiness; taches de rousseur, spots of brownish red.

Routing.—The gouging or drilling out of that portion of a plate the impression from which is not to appear on the paper.

Roxburgh.—A style of binding in which about the same amount of leather is used on the back as in quarto binding, but with no leather corners. It has paper sides and no raised bands on the back, which is smooth and simply lettered; the edges are uncut, except the top edge, which is generally gilt.

Roxburgh Binding.—A book without bands, with a shield-shaped title about an inch from the top with the point downward, mitered with a single line, and a spear-head hanging from the point in gold.

Royal.—An English size of printing-paper, 25 by 20 inches; writing-paper, 24 by 19 inches.

Rub Out Ink.—To rub by means of the brayer the ink on the ink table prior to distribution.

Rubber Stamps.—Hand-stamps cast in vulcanized india-rubber.

Rubber Type.—Separate types cast in vulcanized india-rubber and generally mounted on metal bodies.

Rubbing Out Ink.—To distribute ink after it first comes from the receptacle. The skin, if there is any, should be carefully taken off before this is done.

Rúbrica (Sp.).—The part of missals, breviaries, &c., which is usually printed in red.

Rubricated Letters.—Capital letters printed in red ink.

Rubricated Matter.—Sentences or paragraphs printed in red ink.

Rubricator.—One who in the early ages of printing filled out the blanks left for letters with red or other colored ink, or who underlined particular words or passages in red.

Rubrics.—The directions placed in a prayer-book, which were formerly—and are now sometimes—printed in red ink.

Rubrik (Ger.).—The letters in red.

Rubrique (Fr.).—Red letter.

Ruby.—1. In England the name of the type known in America as agate, the next size smaller than nonpareil, and between that and pearl. 2. The proposed name of a size of type of which the body equals three and a half points. This name should not be used, as it is liable to be confused with the English ruby.

Ruby Nonpareil.—A size of type made in England by Caslon & Co. It is between agate and nonpareil.

Ruck.—A sheet is said to ruck when it gets creased or doubled in laying on.

Ruddiman, Thomas, a printer of Scotland, who became celebrated also as a grammarian and antiquary, was born in the parish of Boyndie, Banffshire, in October, 1674, and received the rudiments of his education there. When he was sixteen he left home without the knowledge of his father, and proceeded to Aberdeen in order to gain a prize which he had heard was always given to genius and learning. On June 21, 1694, he obtained the degree of master of arts, and the next year became a schoolmaster at Laurence-Kirk. An observant stranger who passed through the place in 1699, finding nothing to read, sought his company, was pleased with it, and promised him his aid in the future. This was the celebrated Dr. Archibald Pitcairne. In 1702 he went to Edinburgh as assistant librarian to the Advocates' Library, and in 1706 began working for the booksellers. The next year he was an auctioneer, not relinquishing his post in the library. In 1710 a salary of thirty pounds was settled upon him for his extraordinary care of the library, and in 1715 he began as a printer, being then forty-one years old. The productions of his press are distinguished for their accuracy, and most of them were popular books. His Livy of 1751 is regarded as immaculate. While thus making his own way in the world he was disposed to help others. Literary men and historians received much aid from him. He is generally thought to have been the most learned printer of Scotland. He continued in his post at the library for nearly fifty years, and by his earnings and savings was able to provide well for his family. His death was in 1757, on January 19. His life was written by George Chalmers and published at Edinburgh in 1794.

Rueda (Sp.).—The sheets of a printed work laid out in a circle for the purpose of gathering.

Ruggles, S. P., a press manufacturer before the war, of whom it is to be regretted that there is not information enough to make an extended sketch. He began manufacturing before 1840, and for many years was the leading maker of small presses. He also produced presses suitable for large work.

Ruiné (Fr.).—Spoiled.

Rul (Sp.).—Composing-rule.

Rule.—See Brass Rule and Composing-Rule.

Rule Borders.—A frame, usually of brass rule, fitted around a page.

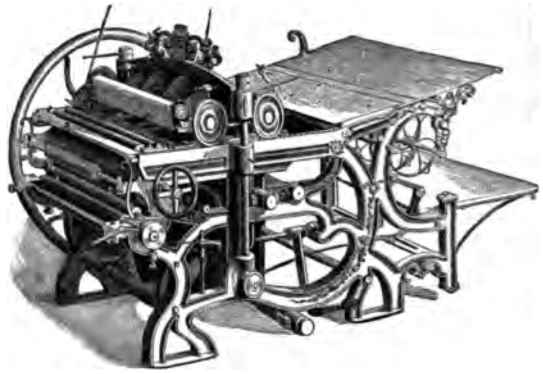
Rule Case.—Trays of the usual size of type cases for holding brass rule.

Rule-Cutter.—An apparatus for cutting brass rule into short lengths.

Rule-Work.—Composition in which rules are largely used, such as table-work.

Ruled Paper.—Papers of different kinds with various rulings, used for account-books, &c.

Rules and Regulations.—No well conducted printing-office can be carried on without rules, yet it is generally a mistake to formulate a vast number of regulations and post them up in different parts of the establishment. Some of those which are to be found in particular offices are unnecessary, for an acquaintance with them is presupposed when a workman is engaged, as he must have served an apprenticeship. It is unnecessary, for instance, to establish a rule that men must pick up the type they drop. All men have been taught this, and a simple reminder when it has been neglected is sufficient. One who persistently drops type and will not pick it up should be discharged. Much that should be done in an office can be learned from mere observation, and those in which the regulations differ materially from another are rare. If all rules were of the nature of the one following there could be no objection to having them posted anywhere: "No workman shall mix copper-faced type and plain-faced type on any pretext. Stone hands are instructed not to make up any matter in which a single letter of one kind appears while the remainder of the type is of the other, nor must any pressman put such a form to press." It is plain that such a rule stops mixing at once, and is a good one. But a great number of minute regulations can be useful only when the men have not properly learned their trades. From these remarks should be excepted the rules which relate to the time of beginning work and ending it, the deductions to be made for short time, the allowance for overwork, and the time of payment.



RUGGLES POWER PRESS.

In one English office the following were the rules laid down by the firm, but they were considered by many persons as unnecessarily stiff, and a strike occurred on account of them. The office hours in the composing-room were from 8:30 A. M. to 7:30 P. M. for four days of the week; on Thursday till 8 P. M., and on Saturday till 2 P. M. In the pressroom the same hours are kept, except that closing is at 8 on Monday and Friday:

"All closed days and holidays will be deducted. 1. These hours will be subject to such alterations as may be deemed advisable by the overseer [foreman] when there is a pressure of work. All employees must work overtime when requested. Any journeyman not being in the office at the appointed time (unless his absence is sanctioned by the overseer) will lose a quarter of an hour; if later than ten minutes, will lose half an hour; if more than a quarter of an hour late he will lose one hour, and if more than half an hour late he will not be admitted till the next time for commencing work. Apprentices arriving late will forfeit double the value of the time lost, which will be deducted from their wages. Overtime will not be allowed until the whole fifty-four hours have been worked. 2. The bell will ring at 8:25 in the morning, and by 8:30 o'clock every one will be required to commence work. Engine attendants and stereotypers to be at the office at 8 in the morning. Engines and machines must be started at once. 3. The bell will ring at 1 o'clock for dinner and at 4:30 for tea; work to be continued till the bell is rung, and resumed when the bell is again rung at 2 and 5. Luncheon time is abolished, and no person will be allowed to send for or bring in refreshments except at the times above indicated. Disregard of this rule will entail dismissal. 4. Each employee will be required to take a numbered ticket upon leaving the works, and hand same in to the timekeeper upon his return. Failing to do so will entail loss of the time the ticket is unrecorded. Any person losing his ticket will be charged 6d. for a new one. 5. Any employee depositing any other ticket than his own will be subject to dismissal. 6. No employee will be permitted to enter any other department without a written authority from his overseer, except he is specially engaged upon some job in that department. 7. Any employee who may be unable, from sickness or other cause, to attend to his duties must send a message to that effect (or post-card by the first post) to Mr. Railton, or his absence will be considered neglect, and treated accordingly. 8. The value of work or material damaged through carelessness must in all cases be paid for. Care must be taken in the use of proof-paper. Rollers must not be left on the ink tables. 9. Persons not employed in the works will not be allowed to pass the timekeeper's desk. 10. Any employee leaving without extinguishing his light when leaving, or turning it down when going to work in another part of the office, will be fined 6d. (to be paid as a donation to the wayze-goose fund [the annual country picnic and dinner]). 11. Gas to be lighted by safety matches, and by no other. Any person using lighted paper will be instantly dismissed. 12. No smoking will be allowed on the premises, and any one breaking this rule will be at once dismissed. 13. Any journeyman idling away his time, neglecting to apply to the overseer for work as soon as he has completed the job he has on hand, misconducting himself, or making any unnecessary noise, will be dismissed. 14. Each employee must enter the number of each job he is employed upon, and the time he is employed on the same, on his daily doc-sheet [time-ticket], and hand it to the overseer before leaving at night, or his time will not be allowed. 15. The overseers of the composing-rooms to see all forms are sent by the lift to the machine-room, and the machinists [pressmen] to see all forms washed and returned in the same way to the composing-room. All type to be properly washed and swilled [rinsed] before being distributed. Wood letters to be oiled. 16. All revise proofs to have the signature of the reader or overseer before the job is worked off. 17. Paper and material of every description to be given out by the person in charge of the warehouse. 18. All work-sheets must be correctly filled up immediately the work is finished, and (together with all proofs and one perfect copy of each job) sent into the counting-house, or a fine of 6d. for each omission will be exacted. 19. All metal galleys to be cleaned and oiled once a week by an apprentice. 20. To avoid the accumulation of pi, every man will be held responsible for all type found near his frame. Dropped letters to be picked up at once, or a fine of 1d. for each letter will be imposed. Any employee discovered destroying or otherwise making away with any type or material will be instantly dismissed. 21. All parcels to be packed and labeled in the warehouse or publishing-room, and entered in the parcels-delivery book before being delivered. 22. All rags in use for wiping grease, oil, &c., to be kept in the iron pails provided for that purpose. 23. All waste-paper to be collected daily, and if not sent off the premises to be put in the sack provided for that purpose. 24. All wages-bills must be in the counting-house by 9:30 o'clock Saturday morning, or they cannot be passed. Wages will be paid from 2 to 2:30 o'clock on Saturdays."

Ruling.—Paper-ruling is the process of marking paper with lines to guide the hand in writing, or for classification, as in the columns of account-books, &c. Go-through work consists of parallel lines ruled the entire length or breadth of the paper, generally with faint blue ink, the sheets being passed through the machine uninterruptedly. Stop-work consists in ruling a given number of perpendicular lines which stop at or begin from a horizontal line and which are generally ruled with red ink. The principle of the ruling-machine is simple. A wooden roller is placed at each end of the machine, the one at the upper end being turned by a handle. Round the rollers revolves a broad band of canvas, and a series of small cords so arranged that the paper is kept in its proper position while it is being ruled. The rollers are grooved to receive the cords, six being sufficient for general purposes. At the upper end of the machine is a table to which a gauge is attached for the accurate feeding of the paper. The sheets are received on the canvas band, which carries them to the ruling-pens fixed in a slide formed of pieces of wood united by screws. When the paper reaches the pens the slide is lowered, and the sheet, moving underneath, receives the ink and the lines are formed. The pens are made of latten brass, and are the channels through which the ink is conveyed to the paper. They are made in pieces, generally five or six on a piece, so that ruling of various kinds can readily be made. If the pens arranged in pieces do not suit the width of the lines to be ruled others should be cut by the pen-making machine. The ink reservoir is a piece of flannel somewhat longer than the pens and is slightly tacked on to the slide with brass pins, so that it can be easily removed. The flannel is supplied with ink by means of a small brush. By fixing separate pieces of flannel on to the slide several colors can be simultaneously ruled. To get the pens into working order and the lines regular a sheet of paper should be passed under the pens several times. The pens should all have a uniform pressure on the paper. If any have not sufficient pressure they should be pressed down gently with the finger; if all have too much or too little pressure the slide should be regulated accordingly by means of the screw for that purpose. Should any of the lines appear thick the pens must be closed with the plyers till the desired fineness is obtained. When the lines appear too fine the pens should be opened by passing a piece of brass down their grooves. To insure uniformity in ruling the lines care should be taken in supplying the flannel with ink, too large a quantity causing thick lines or blots, and too small a quantity "missing," the ink appearing here and there. When the weather is wet the canvas becomes too tight; and when dry, too slack. These defects are remedied by means of a screw attached to the bottom canvas roller. In ruling double-stop work a double-stop slide is required. The pens for the under-stop should be somewhat shorter than those for the upper-stop. Pens that have become short from frequent use will do for this purpose. The under-stop pens are supplied with ink by means of a small piece of flannel nailed on to the lower stop in the usual manner. A triple slide can also be used for ruling in a similar manner to the double slide.

Ruling-Machine.—The apparatus employed for ruling purposes.

Rullo (Ital.).—A roller.

Rulo (Sp.).—A roller covered with cloth, used for taking proofs.

Run in the Carriage.—To move the form carriage or coffin under the platen or cylinder.

Run On.—An intimation that a sentence is not to commence a fresh paragraph, or chapters are not to begin on a different page.

Run on Solid.—To continue any particular matter without break or leads.

Run on Sorts.—An extraordinary demand for any particular letter or letters in composing.

Run Out.—To fill up a line with quadrats or leaders; also to run out of sorts, or to have a deficiency of them.

Run Out and Indent.—To set matter the reverse of ordinary paragraphs by putting the first line full out and indenting the subsequent lines.

Run Out the Carriage.—To move back the form carriage or coffin from under the platen or cylinder.

Run Up.—In bookbinding, when the back has a fillet run from head to tail without being mitered at each band it is said to be run up.

Run Up Color.—To distribute ink and to prepare for printing.

Runic Characters.—The letters used by the peoples of Northern Europe from an early period to the eleventh century. Such letters have been in use in printing since 1611.

Runner.—The front board used in cutting edges in bookbinding.

Runners.—1. In presswork, a line of corks to prevent the roller from depositing an excess of ink on the edges of the pages. In a machine, a flat row of teeth for working cog-wheels in.—*Jacobi*. 2. Figures or letters placed down the length of a page to indicate the particular number or position of any given line.—*Jacobi*. This expression is unknown in America.

Running Secretary.—A face of type used in the sixteenth and seventeenth centuries. It was a law Italic of a very conventional type. It is somewhat similar to the French Lettre de Civilité.

Running-Title.—The words at the head of each page of a book.

Runs In.—Matter is said to run in when it makes less than an anticipated quantity.

ANTHONY O. RUSSELL.

Russell, Anthony O., a printer of Cincinnati, was born in Southington, Conn., on December 4, 1826. His family removed to Ohio during the summer of 1830, and on March 15, 1837, he was apprenticed in a printing-office at McConnellsville, Morgan County, Ohio. His employer gave up business and went to work in the Enquirer office at Cincinnati, where the boy accompanied him and completed his time in 1844. He was then employed in the Delta office in New Orleans, but returned to Cincinnati in 1849 and became the foreman of the Commercial job office. Afterwards he was in succession the foreman of the job-rooms of the Louisville Courier and the Cincinnati Enquirer. Becoming weary of his situation he concluded to learn the river as a pilot between St. Louis and Cincinnati. This he accomplished, and obtained his papers as a licensed pilot. He followed this business till some time after the completion of the Ohio and Mississippi Railroad, which so injured his occupation that he concluded to accept the foremanship of the Memphis Bulletin job office. He remained there until the outbreak of the war and the firing upon Fort Sumter by the troops of South Carolina, when he was politely requested by a committee of one hundred citizens to leave, which he hastened to do. When he arrived at Cincinnati he entered the volunteers as the captain of Company G, Sixth Ohio Volunteer Infantry. He was promoted to major in 1862. On the return of the regiment, after three years' service, he again took charge of the Enquirer job office, which was then the best equipped in all the West, doing a great railroad and show-card business. In January, 1867, in conjunction with Messrs. Morgan, Robinson and Armstrong he purchased the plant, and established the firm of Russell, Morgan & Co. The business has rapidly increased. It occupies two immense buildings, employing many hundred hands and doing a very large line of theatrical, poster, show-card and label work. Playing-cards are very largely made. In February, 1891, Russell, Morgan & Co. united with some other color and label printers in other cities, forming the United States Printing Company. Of this Mr. Russell was elected president, and J. E. Hinds of Brooklyn vice-president. Mr. Russell was elected a delegate from Cincinnati to the original meeting of the printers of the United States at Chicago in 1887, and upon the formation of the United Typothetæ he was elected its treasurer, a position he filled for several years.

Russia.—One of the principal nations on the globe, occupying a very large part of Europe and Asia. Its population in the former grand division is greater than that of any other nation and larger than that of any other country outside of Asia. Many languages are spoken in the European part, but the dominating one is Russian. Recently the literature of that country has become important, and it is now attracting much attention in other lands. Printing has been carried on in Russian since 1517. A press was set up in Moscow at the expense of the state in 1563. Previous to the establishment of the state press books were reproduced by copyists, who were practically uncontrolled by the state. They formed a special industrial class, whose sole occupation was copying, and were so numerous that books were plentiful and accessible in price. But the blunders committed by these scribes were egregious, and often perverted the text. Moreover, they frequently produced books prohibited by the Church. The reproduction of heretical works was punished by anathema, and sometimes even by death. From this point of view government control served as a check to these copyists and neutralized the dangerous part of their work. The state office was originally attached to the emperor's establishment, and the printing was actually done in the apartments of the Muscovite palace. But this innovation was by no means agreeable to the Muscovite police, and society regarded it with an unfavorable eye, for, according to ancient tradition, the copyists' work was much esteemed and ranked immediately after ecclesiastical painting. The copyists, deprived of work and knowing no trade, found themselves suddenly reduced to misery; and their animosity found expression in the conflagration which broke out in 1565, and reduced to ashes the institution they so much abhorred. Under the reign of Peter I. a great advance was made in the art of printing compared with the previous century. In 1707 two new presses, purchased in Holland, completed the Moscow printing establishment. In 1711 an office was organized at St. Petersburg. Besides these there was another small office at Moscow, and towards the end of the reign of Peter the Great three new presses were set up at St. Petersburg.

Nevertheless, little real progress was made while printing was the monopoly of the state. The state offices were by no means punctual in the execution of orders; and high functionaries frequently demanded books without payment. Moreover, the workmen were unable to obtain their wages regularly. But however defective the organization of the press might be when under the exclusive management of the state, no lack of workmen was experienced when that control ceased and the trade was thrown open; on the contrary, skillful workmen were very numerous. Russia is indebted to the Empress Catherine II. for the downfall of the state monopoly.

The number of titles recorded in 1888 amounted to 7,427, and the total number of copies printed to 21,103,272. Of these 5,318 books were in Russian, 716 in Polish, 343 in Hebrew, 311 in German, 217 in Lettish, and 178 in Esthonian. St. Petersburg and Moscow are the chief literary towns, followed by Warsaw, Odessa and Riga. The total number of periodicals was 667, of which 493 were printed in the Russian language, 76 in Polish, 49 in German, 13 in Esthonian, 8 in Lettish and 7 in French. The most of these were printed in St. Petersburg.

The condition of the printer in Russia is that of the workman of the fifteenth and sixteenth centuries in England, although, of course, business is carried on upon a larger scale. No fixed salary is paid. In many offices the work is given out by the piece, and the compositor puts in his account for what he thinks the job is worth. At the end of the month the account is examined, and a quarter, sometimes even a half is deducted by the overseer. Monthly payments are the rule. Hard workers earn from ten to twenty dollars a month, according to their industry. Night or Sunday work is generally paid for at the rate of twelve cents an hour. For piece-work there are no fixed working hours, the average being about fifteen per day.

The Russian alphabet consists of thirty-five letters, which exist both in the capitalized and the lower-case form. Owing to the squareness of the letters and the fact that there are few ascenders and descenders, the lower-case looks much like small capitals. Originally the Russian characters were taken from the Greek, many, however, being altered and of some two forms being constructed which could be used for different letters. The case is a single case, as in Germany, and much of the type is supplied from that land.

These characters have no exact method of being changed over into Roman letters. Pronunciation is usuually followed, which is thus, figures being used to refer to the alphabet:

1, a as in father; 2, b; 3, v; 4. g; 5, d; 6, consonant y; 7, zh; 8, z; 9, ee; 10, ee; 11, k; 12, l; 13, m; 14, n; 15, o as in stock; 16, p; 17, r; 18, s; 19, t; 20, oo; 21, f; 22, ch as in the German language; 23, tz; 24, ch as in church; 25, sh; 26, a compound sound of sh followed by ch; 27, no sound by itself, but serves to show that the preceding consonant must be hard; 28, short sound of y; 29, no sound of itself, but serves to show that the preceding consonant must be soft; 30, consonant y; 31, short e; 32, u as in use; 33, consonantal y; 34, ph; 35, ee; 36, short e. 27 and 29 are represented in printing in Roman characters by e. There are many accidental sounds, or those which do not correspond to the above key.

The letters which resemble each other most closely are 1 and 5, or a and d. The latter is closed at the bottom, while the former is not closed, but has a crossbar. 9 and 14, long e and n, are alike, but the crossbar in the former, which is like our H, is inclined from the top of the second body mark to the bottom of the first. 16 and 23, p and tz, differ only in a queue or tail at the bottom, which the latter possesses. 25 and 26, sh and shch, differ in the same way. 15 and 34, o and ph, vary by having the latter possess a horizontal flourish in the centre.

The letters most used in Russian are 15, short o; 6, short e; and 14, n. Each of these takes about one-eleventh of the lower-case letters. Next to them come 1, a; 3, b; 9, long e; 18, s; and 19, t. Each of these has about one-twentieth. Together these letters constitute one-half of

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RUSSIAN CASE.

Аа	Бб	Вв	Гг	Дд	Ее	Жж	Зз	Ии
1	2	3	4	5	6	7	8	9
Іі	Кк	Лл	Мм	Нн	Оо	Пп	Рр	Сс
10	11	12	13	14	15	16	17	18
Тт	Уу	Фф	Хх	Цц	Чч	Шш	Щщ	
19	20	21	22	23	24	25	26	
Ъъ	Ыы	Ьь	Ѣѣ	Ээ	Юю	Яя	Ѳѳ	
27	28	29	30	31	32	33	34	
Ѵѵ	Йй							
35	36							

RUSSIAN ALPHABET.

the lower-case characters required in any given piece of composition.

Russia Leather.—The genuine article is made in the country whose name it bears, and is generally of a red color, although it sometimes comes in black, very dark blue or green. The styles of binding in this leather are much the same as in Turkish morocco, the prices, however, being about 50 per cent. higher. American cowhide is now being made so closely to resemble Russian leather that it would be impossible to detect the difference did it not lack the lasting and pleasant odor emitted by the latter, the secret of imparting which has never been discovered in this country.

Ruthven Press.—An iron hand-press constructed by Ruthven, a printer of Edinburgh, in the early part of the century. The form was placed upon a stationary bed, upon which the frisket and tympan folded. At the moment of impression the platen, which had before been at one side, was directly over the form, having been moved on rollers to the proper place. The power was obtained by a lever moved by the pressman's left hand and the weight of his body. This lever was a compound one, moving the platen very rapidly at first, but towards the end, when it was in a position to exert its utmost power, very slowly. The leverage was entirely beneath the bed, and the top of the platen, which was the highest part when the impression was taken, could not have been more than three and a half feet from the floor. It was therefore very compact and took little room, while the exertion required was small, as the labor of moving the platen would be slight compared with that of moving the bed and tympan. Several of these presses were used in this country.

Ryan, John, a type-founder of Baltimore, was born in Baltimore County, Md., on May 6, 1820. In early life he went to New York city, where he learned his trade, which was then comparatively new on this side of the water. He was of the second generation of men who were engaged in it. He remained in New York for several years after attaining his majority, but about 1848 returned to Maryland to take employment with the Lucas Type-Foundry. In 1858 he entered upon business for himself, which he continued with success till his death, on May 8, 1888. For many years he was vice-president of the American Type-Founders' Association. He left a widow and three daughters, one of the latter afterwards taking an active part in the management of the foundry.

S

S THE nineteenth letter of the alphabet. The lower-case letter is among the most frequently used consonants, and the capital is used as much as any other. As a number in Latin it signifies seven. It is the common abbreviation for societas and socius (fellow). It is also used in some Catholic and Episcopalian books for St., as S. Mark. S. S. stands for sanctissimus; S. D. for salutem dixit; S. P. D. for salutem plurimam dixit; S. P. Q. R. for Senatus Populusque Romanus.

Two forms of the lower-case letter are known. One is composed of two curves which bend in opposite directions, the lower one being considerably larger than the other. The other form resembles an f, except that the bar near the top does not go completely across. It is no longer used except in reproductions of antique work. In this the rule is that it is used at the beginning of syllables, but not at the ending. When two s's come together the ascending s is employed for the first, the other being the small s.

Saint Louis.—This city, the chief one on the Mississippi River, was also the first place west of that stream in which the art of printing was practiced. Settlement began there in 1764, and in 1808 the first newspaper was established, Missouri not yet being an organized territory. It was entitled the Missouri Gazette, but in 1822 was changed to the Missouri Republican. This journal is still issued. A rival was printed in 1816, entitled the Emigrant. From time to time new journals were founded, and after 1840 independent job offices. There are now in that city 12 daily newspapers and 139 other periodicals. There are a great number of job offices and lithographic establishments, many bookbinderies and two type-foundries.

Salem.—This was the third place in the colony of Massachusetts where printing was carried on. It was begun there in 1768 by Samuel Hall. Ezekiel Russell, John Rogers and Mary Crouch were other early printers. At present two daily papers and nine other periodicals are printed in Salem.

Samaritan.—A type bearing a close resemblance to Hebrew. The Roman Propaganda had a font of it in 1636. It was also used in printing a Pentateuch in polyglot at Paris in 1645.

San Agustino (Sp.).—Name given in Spain to Cicéro or twelve-point, probably on account of that type having first been used in an edition of St. Augustine's works.

San Francisco.—Printing was introduced into this, the chief city of the Pacific slope, in the year 1847. On January 7 of that year Samuel Brannan began the Californian Star, with Dr. E. P. Jones as editor. It was a weekly journal of four pages, 16 by 12 inches, four columns to the page. On May 22 of the same year the Californian also appeared, of the same dimensions as the Star. The type used on the Californian was originally brought from the city of Mexico, and contained no w's, and the compositors were in consequence compelled to use two v's together where a w was necessary. Both newspapers were suspended temporarily soon after gold was found, the entire force going to the fields. About the beginning of 1850 the Alta California, which had absorbed the Star and Californian, appeared as a daily paper. Many other journals were begun in the decade between 1850 and 1860, but quickly passed away. One reason was the great cost of publishing. Compositors' wages were for a long time a dollar a thousand ems, and for a brief period were as high as two dollars and a half for the same amount. Single copies of newspapers retailed at twenty-five cents. Among the journals which were for a time successful, but which were compelled to cease publication during this period was the Herald. In 1856 it was the strongest of all the daily papers in San Francisco. When James King of William was murdered by the rowdies of that city, the Herald ridiculed the efforts of the Vigilantes, who had determined to put a stop to disorderly proceedings by force. The leading business men of the city, almost in a procession, marched to the office of the paper and discontinued their advertisements and subscriptions. The Herald was forced to reduce its size and finally to close up. This was the first effectual boycott on an American newspaper. The press of San Francisco has been distinguished for its polyglot character. Daily papers were published there twenty years ago in French, German, Italian and Spanish, and weekly journals in a score of other languages. In 1890 there were published in this city 16 daily and 93 other periodicals. In job printing its work has been meritorious and of late has been large. There are several book publishers and many bookstores, but owing to the high price of labor and of commodities this city did not early take the rank to which its size and position entitled it. There are several lithographers, a number of bookbinderies and a few printers' supply men in San Francisco, their stocks being obtained from the Atlantic slope, excepting that in type it has long had an agency for a Scotch foundry. It has no competitor in printing upon the Pacific coast.

Sanborn, George Henry, manufacturer of bookbinders' machinery, was born at Concord, N. H., on July 30, 1830. His father, Oliver L. Sanborn, was a well-known publisher in Boston and Portland, in the latter city having been the publisher of the Portland Argus, and in the former one having been in the publication of books. George H. Sanborn began learning both the bookbinding and printing trades when a boy with his father at Portland, and became an accomplished workman. While employed as a journeyman bookbinder he invented his roller backing-machine, or as it is more familiarly known, the edition-backer. This was rapidly

GEORGE HENRY SANBORN.

introduced at home and abroad, Mr. Sanborn going personally three times to Europe on its account, and obtaining prizes for it at three international exhibitions. He began the manufacture of these machines and others adapted to the use of bookbinders in Boston, but in 1867 removed to New York. He purchased the Law patent for an automatic turn-table trimmer, eliminated the bad features and added new ones, thus producing what is now known as the Star book-trimmer. His cutting-machines obtained a high reputation. Circular sawing-machines owe much to Mr. Sanborn's talent. In 1861 he produced an embossing-press with heavy wrought-iron rods shrunk through each side of the arch and further secured by nuts at the top. Among other inventions made by him were a patent churn, a railroad chair for rails, a freezer and a machine for separating iron from glass in the manufacture of glass. In 1879 he established a branch house in Chicago. After his sons were of sufficient age he associated them with himself in business under the title of George H. Sanborn & Sons. They still continue it with the same name, Hermann L. Sanborn being in New York and George E. Sanborn in Chicago. The death of the senior member was at Chicago on January 26, 1881. Mr. Sanborn was a self-made man, starting in business for himself when about twenty-two years old, and from that time until the close of his whole business career he relied entirely upon his own exertions for attaining his marked success.

Sands, Samuel, one of the oldest printers in the United States, died in Baltimore on July 28, 1891. He was in his ninety-second year. He began his apprenticeship in 1811, and in 1836 published the Freeman's Banner. He was also the publisher of the American Farmer, the earliest agricultural paper in Maryland, and of the American Chronicle. He was for many years secretary of the Whig State Central Committee, and during the Civil War was an unconditional Union man. He was a founder of the Maryland Institute for the Promotion of the Mechanic Arts, and was for many years its secretary and for two terms its president. During its entire existence he was also secretary of the Maryland State Agricultural Society. When an apprentice in the office of the Baltimore American in 1814 he put into type, fresh from the author's hands, the song of the Star Spangled Banner. Left alone in the office on account of his youth while the other hands went into the trenches when the British made their attack upon that city, he put the poem into print in the shape of a broadside, which he distributed throughout the city. His death was due to old age. He retained his mental powers almost to the last days of his life.

SAMUEL SANDS.

Sangrar (Sp.).—To indent.

Sangria (Sp.).—Indentation.

Sans Serif.—In England, the type which is here called Gothic. It has no serifs and the lines are equal or nearly equal in thickness.

Sanskrit, also written **Sanscrit.**—The learned ancient language of Hindustan, first brought to the attention of European scholars about a hundred years ago. It belongs to the Indo-European group of languages, which includes the Teutonic, Celtic, Latin and Greek tongues, and is of great value in exact study of any of these languages, because its structure is so perfect that it shows many of the steps which have in the course of time been obliterated in them. There are ten vowels, four signs for diphthongs, and thirty-four consonant signs. To some extent the vowels are placed over and under the consonant signs.

Sanspareil Case.—A case with no compartments. The term is used in England, but not in America.

Satinage (Fr.).—The glazing or calendering of paper, a surfacing effected by means of rolls which exert great pressure, giving a lustre.

Satinar (Sp.).—To calender or dry-press paper.

Satiner (Fr.).—To glaze or give a lustrous surface to paper by calendering.

Satz, der Glatte (Ger.).—Plain composition ; type which has been set up ; in grammar, a sentence.

Satiniren (Ger.).—To press paper between metal, giving it what is called a satin finish ; also the surface given by calendering ; satinirtes papier, calendered or smoothly rolled paper.

Savings-Galley.—A receptacle for type which has been used, but of which the whole or part may again be employed. It is usually in this country inclined at the top, the back being highest. The whole top is sometimes of brass, but sometimes of zinc and sometimes of wood. It is divided by brass projections, against each of which type slightly inclined can rest.

Saw-Benches.—Sawing-machines, used in book-binderies.

Saw-Block.—A block of wood in which slots are cut, used for sawing up furniture on ; a mitre-box.

Sawing-in.—When the back of a book is sawed for the reception of the cord in sewing.

Sawing-Machine.—A machine for sawing the backs of books quickly.

Saxon.—1. The proposed name of a size of type of which the body shall equal two points. 2. Another name for Old English or ANGLO-SAXON, the language of England from A. D. 450 till 1250, which see.

Scabbard.—One form of the word scale-board, formerly used where leads are now employed.

Scabby.—A term applied to uneven and rotten color in printing.—*Jacobi*.

Scaffala (Ital.).—A frame or stand.

Scale of Prices.—The rate of wages paid to workmen, with all of its conditions and exceptions. With the exception of a dozen places in Europe, very few printing-offices before the middle of the last century employed more than two or three journeymen or half a dozen apprentices. Work began soon after daybreak and continued till nearly bedtime. One hundred and fifty years ago the workmen of London and Paris, the two most considerable book-producing cities of the world, had no regular scale. There was an understanding about weekly prices, and also about the cost of piece-work, but this was not formulated, and printers worked as they pleased. The earliest scale in England of which there is any account is that of London in 1785, and the next earliest anywhere that of New York in 1800. The rates appear to have been in London threepence halfpenny a thousand letters, brevier threepence farthing, and English fourpence. Small type appears to have been paid for at a less rate, as there was less labor in the make-up and the justifying. The workmen met on April 6, 1785, and agreed to ask the masters for an advance. The latter took the matter into consideration, and on November 20 assented to five of the propositions submitted to them by the journeymen and dissented from three. The average then paid, turning it into American money and measure, was sixteen cents a thousand ems, and it was advanced to eighteen cents. The em and en quadrats at the beginnings and ends of lines were not to be counted in the width. These blanks were thus put there because leads were of wrong measures. A book might be nineteen ems wide, while the nearest lead would be twenty ems. Such leads were accordingly used and the matter was indented enough to make the face appear right. Fivepence was to be paid on foreign languages and on dictionaries in two languages. In 1793 the scale was altered so that head and foot lines, which before had been set by the compositor without compensation, should be charged for, and the full width of the line, or the length of the lead, should also be counted. In 1795 all type larger than English, it was agreed, should be charged for as English. In 1800 three farthings per thousand were added. Time-work was then fivepence per hour. In 1805 a general readjustment of the scale took place, there being twenty-seven articles or definitions, but no advance of any moment. Nonpareil was to be sixpence farthing and pearl eightpence, while the regular run of work was fivepence farthing. In 1810 a distinction was made for the first between leaded and solid work, the latter being worth a farthing more. In 1816 reprint was lessened three farthings. Changes have frequently been made since, each year the clauses becoming more definite.

About the year 1800 a scale was formed in New York. It represents a higher rate than was then paid, but is curious as showing the low rates of wages and the absence of complexity. It is given here entire, as it has not been reprinted since that time:

COMPOSITION.

1. That works done in common matter be paid for by m's, at the rate of 25 cents per 1000 (except such as are hereafter provided for), and when a number of m's over even thousands occur in a sheet, should they be under 500, the odd m's to be suppressed in the charge; but should the odd m's be 500 or upwards, to be charged an additional thousand.

2. That all side, bottom or in-cut notes be each of them, whether occurring together or separately, paid for at the rate of 25 cents per sheet; and should they exceed what is considered as moderate the price shall be struck by the journeymen of the office and the employer. No charge, however, to be made for bottom or in-cut notes unless they, in the course of the work, exceed half a page; and should there be upwards of that quantity, though the number of volumes be ever so numerous, every volume shall be paid for at the same rate. The width of side-notes always to be included in the text.

3. That works done on type less than brevier, if common matter, be paid 31 cents per 1000 m's.

4. That all works done in columns be paid at the rate of 1000 m's per sheet for every column after the first (except double or treble folio or quarto) in addition to the common charge; and when any work shall be much mixed with Italic there shall be an additional charge, according to the trouble.

5. That works done in a different language from the English (though common type) be paid 31 cents per 1000 for brevier or upwards, and 37½ from brevier downwards.

6. That if a quantity of Hebrew, Greek or other dead character shall be intermixed in a work, so as to be troublesome to the compositor, there shall be additional charge, according to the trouble; and works done in either of the above characters shall be paid double.

7. That making up a set of furniture for a work of five sheets or under be paid 25 cents.

8. That works done partly in figures and partly plain, such as arithmetical works, &c., be paid one-half in addition; and all rule and figure work be paid double.

9. That ruled sale catalogues, &c., be paid one-half extra.

10. That broadsides be paid one-third in addition to what they amount to by m's.

11. That all jobs (not otherwise herein provided for) done on English or larger type be paid 25 cents per 1000; all letter larger than English to be calculated as English; and those on a smaller type 31 cents per 1000.

12. That all time lost by alteration or otherwise be paid at the rate of 15½ cents per hour.

13. That head and direction lines (the blank after the running title included) be calculated in the text; and that when there shall be a blank-line at the foot of the page, and no direction, the same shall be calculated in the text.

14. That casing or distributing letter be paid at the rate of 15½ cents per hour.

15. That all algebraical works, or those where characters of music are the principal part of the same, be paid double the price of common work; and all works comprising physical, astronomical or other signs be paid for at a medium to be struck by the journeyman and employer.

16. That no journeyman, employed in a book office, shall receive less than seven dollars a week for his services; nor those on daily papers a less sum than eight dollars.

PRESSWORK.

1. That all work done on brevier or larger type, on medium or smaller paper, be paid 31 cents per token; if on minion or smaller type, 37½ cents per token; and if on royal or super-royal paper, on brevier or larger type, 37½ cents; on minion or smaller type, 50 cents per token.

2. That jobs, folio, quarto, &c., of 200 or under, be paid 31 cents; those of a larger number, 12½ cents per 100.

3. That cards, if 100 or under, be paid 25 cents; any other pack or packs at 12½ cents per pack.

4. That broadsides on demy or smaller paper be paid 31 cents per token or under; and on medium, royal or super-royal, 37½ cents; and on elephant or imperial, 50 cents.

5. That parchment jobs, not exceeding the size of half-a-sheet of demy, be paid, if 100 or under, 31 cents; and if a larger number, 25 cents per 100; if above that size, 50 cents per 100 or under; and if a larger number, 37½ cents per 100.

6. That 50 cents be paid for putting on a parchment or a linen tympan.

7. That if at any time it shall be requisite to take down a press, or any part thereof, an allowance of 15½ cents per hour shall be made to each pressman employed at it during the time they shall be prevented from proceeding in their regular work.

8. That if a boy be put to press to be regularly brought up, there shall be an allowance of half the boy's earnings for six months to the pressman who shall have charge of him. When the journeyman is employed by the week an additional dollar each week for six months.

9. That if a pressman shall be obliged to lift his form before it is finished, he shall be allowed for the same 12½ cents.

10. That no journeyman working at press on a daily paper shall receive a less sum than eight dollars for his weekly services. That sum to be raised according to the trouble.

Based upon the two scales of New York and London, every considerable town where the English language is spoken has now a regular tariff of prices, some of them covering many particulars. The morning newspaper rate is the highest, the evening newspapers and the weekly newspapers coming next. The book-scale is the lowest everywhere, although a book compositor cannot set more than three-quarters as much as a compositor on a daily newspaper, each being alike in capacity.

It appears in forming a scale that the easiest work should be paid for at the lowest price and the most difficult should receive the highest. It is therefore inequitable to give the same price for manuscript and reprint, leaded and solid. Difficult work is given to good compositors, for they alone can do it, and consequently the easiest work goes to the poorest journeyman. If all matter is paid for at the same rate this is in effect imposing a fine upon the good workman for having learned his trade well and gives a bonus to the poor workman because he has not learned his trade and is an ignoramus. Another consideration applies to good copy. It can be set anywhere, and consequently the employer in large cities is liable to have it bid away from him by small towns where living is cheap and where hands are easily satisfied. It seems abstractly that manuscript ought to be worth about 20 per cent. more than reprint, as it is more tedious, requires greater skill to read it, and the office is more delayed on proof. Matter leaded with a

	Solid.	Leaded.
Reprint	28	24
Modified Reprint	29½	25½
Manuscript	34	29
Reprint	30	25½
Modified Reprint	31½	27
Manuscript	36	30½
Reprint	33	28
Modified Reprint	35	29½
Manuscript	40	34
Reprint	36	31
Modified Reprint	38	32½
Manuscript	43	37
Reprint	40	34
Modified Reprint	42	36
Manuscript	48	41

six-to-pica lead on type brevier size and above, and with seven or eight to pica on the smaller sizes, certainly gives the men 15 per cent. advantage over work on solid matter. There is, too, as Hansard points out, a third kind of copy, which is reprint with alterations. The measure is different; the punctuation and capitalizing are to be remodeled, and other minor changes are to be made. This is worth 5 per cent. more than plain reprint, line for line, or at least with no alteration. A table therefore might be constructed, as in the preceding page, showing a scale as it should be, with a basis of exact reprint at 28, 30, 33, 36 and 40 cents a thousand ems, which would more accurately show what ought to be paid to the workmen than any scale now does.

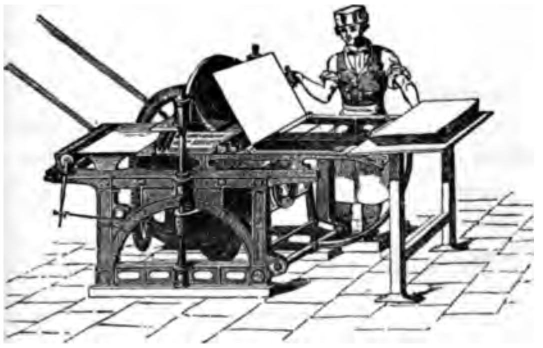
By this scale he who knows little would earn little, while he who is skillful would obtain the best wages.

The scales of the earlier years were mostly the result of conferences between the workmen and their employers. Of late they have been made by the journeymen alone. If these were material advances and the employers felt strong enough they frequently refused to pay, and a strike occurred, sometimes being decided one way and sometimes the other. If the changes were small the proprietors usually concurred.

Scale-Board.—Very thin strips of wooden furniture used for obtaining close register in printing.—*Jacobi*. In Moxon's time, two hundred years ago, it was thin sheet iron. The compositor cut it quadrat high to the length desired. It was sold by the ironmongers in bundles. The employment was for the same purpose that leads are now used. In 1840, as we learn from Savage, it was seldom employed, except in forms next to the crosses, to facilitate the making of register at press and in making margin uniform. It has not been employed in America within the last sixty years, as reglets and leads are much more available.

Scale Prices.—Specific prices adjusted to the recognized scale as agreed to by employers and employed, varying according to locality.

Scandinavian.—A printing-machine with a single cylinder, introduced many years ago into England by the inventor, a Scandinavian.



SCANDINAVIAN MACHINE.

Scarce Sorts.—Any particular letter or letters in great demand through a run on sorts.

Scharniere (Ger.).—The joints.

Schedule.—With a book compositor, a list passed with the make-up, containing folios on which the compositor marks his name opposite the pages set by him. With a copy-cutter on a daily paper, the list of articles which have passed through his hands. With an editor, the approximated list of the articles which will appear in next day's paper, with their probable length. The city editor also keeps one for his department, and his schedule is cut down when he is told that he cannot have as much space as he had expected.

Schere (Ger.).—Shears.

Schiefstege (Ger.).—Beveled furniture.

Schiff (Ger.).—The galley.

Schiffszunge (Ger.).—The slice or tongue of a slice-galley.

Schlagwort (Ger.).—Catchword; the main word in the title of a book, by which it is catalogued.

Schliessen (Ger.).—To lock up a form.

Schliessplatte (Ger.).—The imposing-stone.

Schmutztitel (Ger.).—The bastard title; the outer title or cover title.

Schneiden Sich (Ger.).—To bite, to cut.

Schnitt (Ger.).—Cut; edges; the finish of the three cut sides of a book, such as marbled, comb marble, dotted, sprinkled, gilt edged; weisser Schnitt is the natural color of the paper; the mark left by the graver.

Schnittlinie (Ger.).—The cut-off line, the dividing line.

PETER SCHOEFFER.

Schoeffer, Peter, one of the three persons commonly regarded as the inventors of printing, was born at Gernsheim, a little village situated on the Rhine, near Mentz, about the year 1430. While still a very young man he was employed as a copyist in Paris. He was in the employment of Gutenberg at Mentz for some time, and after Fust took possession of the printing-office he conducted it with much skill. His first known book was the Psalter of 1457, a folio of one hundred and seventy-five leaves, nested together by tens. The pages are about 8 by 12 inches, the type employed being in the Psalms double paragon and the connecting text double great primer. It has many initial letters, which are of unusually large size and are colored. Only seven copies are now known to exist, which are on vellum. One of these was for sale in New York a few years ago. The price asked was $26,250. It is generally regarded as the finest work issued from the early press. Two years later the Rationale Durandi was published, and in 1460 the Constitutions of Pope Clement V. The capture of Mentz in 1462 stopped the press of Fust and Schoeffer, no book being known which was issued by them during the next two years. Fust died in 1466, and Schoeffer took his place as the head of the printing-house; he was a skillful business man and established agencies for the sale of his books and those of others at Lübeck and Frankfort. During his latter years he was made a judge, but still carried on printing, although with lessened energy, till his death, about the year 1502. It appears that he was the inventor of leads; but it does not appear, as has often been alleged, that he was the one who perfected the new art, succeeding Gutenberg. His greatest achievement was the Psalter, probably begun by Gutenberg. In no later book does he appear to have equaled this production, either in presswork or in type-cutting. He was a son-in-law of Fust.

Schöndruck (Ger.).—The fair impression; the first side of a sheet.

Schraube (Ger.).—The screw.

Schraubenzieher (Ger.).—The turnscrew, the screwdriver.

Schreibschrift (Ger.).—Script type.

Schrift (Ger.).—Type; ein Guss Schrift, a font of type.

Schriftfach (Ger.).—Box of a case.

Schriftgiesser (Ger.).—Type-founder.

Schriftgiesserei (Ger.).—Type-foundry.

Schriftkasten (Ger.).—The case.

Schriftkegel (Ger.).—The body of a type.

Schriftmatrize (Ger.).—The matrix.

Schriftmetall (Ger.).—Type metal.

Schriftprobe (Ger.).—Specimen sheet or book of types.

Schriftschneider (Ger.).—Letter-cutter.

Schriftsetzer (Ger.).—Compositor.

Schriftsteller (Ger.).—Author, writer.

Schriftstuck (Ger.).—A handful of type, tied up.

Schriftzettel (Ger.).—The bill of type; the type named by quantities and in due proportions.

Schwamm (Ger.).—Sponge.

Schweizerdegen (Ger.).—Literally, Swiss sword (a handy weapon which is sharpened on the two edges). In a printing-office, one who can work either at press or case.

Scomposizione (Ital.).—Distribution.

Scoring-Machine.—A mechanical apparatus for scoring cards, to allow of folding without breaking.

Scoring-Rule.—A rule a little higher than type, preferably made of steel, so that it shall cut into a card. The name is English.

Scotland.—Printing has been carried on in Scotland since 1507 or 1508, when Walter Chepman and Androw Myllar began business in Edinburgh. They were followed by others named under EDINBURGH (which see), the number increasing, until in 1779, as stated by Arnot, there were no fewer than twenty-seven printing-offices in that city. The art was introduced into Glasgow in 1630 by George Anderson, who was succeeded by Robert Saunders in 1661. In 1740 Robert Foulis, famed for his correctness and the beauty of his impressions, began there. Newspapers were first printed in Leith in 1651, Edinburgh in 1655, Glasgow in 1715, Aberdeen in 1748, Kelso in 1797, and Greenock in 1799. Circulations were formerly very small. It was thought wonderful that the edition of a Glasgow newspaper containing an account of the battle of Waterloo, and published as soon after as the details could be obtained, should mount up to 2,122 copies. The oldest existing paper is the Edinburgh Gazette, which began in 1699. Of the 132 papers in existence in 1868 only 5 dated back to the beginning of the century, and 75 were begun in 1850 or afterwards. Out of the 132, 11 were daily. At the present day much printing is executed in Scotland. The industry and energy of its people and their general education have made this country remarkable in this respect. Edinburgh in quantity of printing probably does not fall below any cities in the world except London, Paris, New York, Berlin, Leipsic, Vienna, Chicago and Philadelphia. It probably exceeds Lyons, Amsterdam, St. Petersburg, Boston or Copenhagen. Immense capital is employed in this line. Glasgow and many smaller towns do a great deal of work, both on Scotch and English orders. The character of the work is good. Wages are low, judged by American standards. In Edinburgh the weekly stipend of a compositor is 30 shillings; Glasgow, 32 shillings and 6 pence; Paisley the same; Inverness, 26 shillings; Dunbarton, 30 shillings; Dundee, 26 shillings; Dunfermline, 25 shillings; and Ayr, 26 shillings. The number of hours will average fifty-four.

Scott, Walter, a press-builder of Plainfield, N. J., was born in Scotland on May 22, 1844. He was educated at the Ayr Academy, studied theoretical and applied mechanics, and learned the machinist's trade. In 1869 he came to the United States and settled in Chicago. He was employed in several printing-offices in that capacity, and finally in the office of the Inter Ocean. Here his abilities were shown in various improvements in the pressroom, and after a time he became the foreman of the pressroom. While there he invented a press which was put into use on that paper, and he proposed other novelties. This was in 1872. In 1884 he found it necessary to erect works at Plainfield, N. J., and the business has since then been carried on there. Mr. Scott is still applying himself to new inventions, his list of patents now reaching about one hundred.

WALTER SCOTT.

Scott Presses.—The presses manufactured at Plainfield, N. J., by Walter Scott & Co. They embrace a multitude of styles and ideas. Prominent among them are web presses, printing, cutting and folding from a reel of paper.

Scrape Up.—To clean a roller by scraping off the coat of protecting ink.

Scratch Comma.—A sign thus, /, used in old documents and reprints. It is now used as a shilling mark. This was one of the earliest marks of punctuation, and was retained in use by the Dutch printers in some work until very lately.

Scratched Figures.—These are used in division to represent the dividing and divided figures as having been used. They are thus represented:

$$\cancel{1} \quad \cancel{2} \quad \cancel{3} \quad \cancel{4} \quad \cancel{5} \quad \cancel{6} \quad \cancel{7} \quad \cancel{8} \quad \cancel{9} \quad \cancel{0}$$

Dotted figures are used for the same purpose. They are also called canceled figures.

Screw Chases.—Chases mostly used for newspaper work, fitted with screws to obviate the use of wooden quoins. They are also used on a job press to allow a larger form to be printed.

Screw Composing-Stick.—The old-fashioned composing-stick, which is fastened by means of a screw with a slotted head.

Screw Hammer.—A tool with a screw attached to the claw, whereby it can be used as a spanner or wrench to any width up to a certain point.

Screw Quoins.—A term for the screw substitutes for wooden quoins.

Scrinium.—In ancient Rome, a large case in which manuscripts were contained.

Script.—Under this title a large number of faces are comprised. They are all designed to imitate handwriting, and differ very much. They are in capitals and lower case alone, emphasis being given either by justifying in some other letter or by drawing a line beneath. In many forms there is a double set of capitals, one more ornate than the other, and nearly all have initial or ending letters and flourishes, designed to work in with the remainder of the characters. In 1815 Didot contrived a script on a leaning body, so as to make the joinings more perfect and to give a better shape to the letters; but this form has been nearly abandoned. The great difficulty in cutting script has been to make the lines of one letter join to those of the next. These lines are always light, but the task is filled with difficulty, and this and the trouble of forming true ovals and curves make the engraving of a set of characters of this kind more expensive than any other. The largest script now made is eight-line pica, and it descends from that to long primer. It is impossible with a true script to get many words on a page. The type is generally very tender, and the popular taste does not now favor scripts when other type can be used. It is therefore a waste of money in a small office to provide many script faces, as nearly all that is required is some law Italic or similarly inclined face. Scripts have been regularly used in printing-offices since about 1648, and before that date there are examples.

Scriptorial.—A type made in 1700 which was midway between a script and an Italic.

Scriptorium.—The room in an abbey or monastery in which the monks in the Middle Ages did their copying and binding.

Scriptural Allusions.—The Bible is frequently referred to as a source of information in regard to the ancient methods of engraving, preserving records, making books, &c. Below will be found some of its most striking allusions to such topics:

And he said, What pledge shall I give thee? And she said, Thy signet, and thy bracelets, and thy staff that is in thine hand.—*Genesis*, xxxiii, 18.

So she wrote letters in Ahab's name, and sealed them with his seal.—1 *Kings*, xxi, 8.

And because of all this we make a sure covenant and write it; and our princes, Levites, and priests, seal unto it.—*Nehemiah*, ix, 38.

In the name of King Ahasuerus was it written, and sealed with the king's ring.—*Esther*, iii, 12.

And a stone was brought, and laid upon the mouth of the den; and the king sealed it with his own signet, and with the signet of his lords; that the purpose might not be changed concerning Daniel.—*Daniel*, vi, 17.

With the work of an engraver in stone, like the engravings of a signet, shalt thou engrave the two stones with the names of the children of Israel: thou shalt make them to be set in ouches of gold.—*Exodus*, xxviii, 11.

And further, by these, my son, be admonished: of making many books there is no end; and much study is a weariness of the flesh.—*Ecclesiastes*, xii, 12.

Then Darius the king made a decree, and search was made in the house of the rolls, where the treasures were laid up in Babylon. And there was found at Achmetha, in the palace that is in the province of the Medes, a roll, and therein was a record thus written.—*Ezra*, vi, 1-2.

The paper-reeds by the brooks, by the mouth of the brooks, and every thing sown by the brooks, shall wither, be driven away, and be no more.—*Isaiah*, xix, 7.

Having many things to write unto you, I would not write with paper and ink: but I trust to come unto you, and speak face to face.—2 *John*, 12.

Oh that my words were now written! oh that they were printed in a book! That they were graven with an iron pen and lead in the rock forever!—*Job*, xix, 23-24.

Oh that one would hear me! behold, my desire is, that the Almighty would answer me, and that mine adversary had written a book.—*Job*, xxxi, 35.

The sin of Judah is written with a pen of iron, and with the point of a diamond: it is graven upon the table of their heart, and upon the horns of your altars.—*Jeremiah*, xvii, 1.

Scrittura Interlineare (Ital.).—Composition done in one language with the translation of each word immediately below it.

Sculpto-Fusi Types.—Types the shanks of which have been cast in a quadrilateral mold, and the faces engraved by hand afterwards. This is Mr. Reed's statement of Meerman's theory, with which he does not agree. It seems hardly possible that type were ever made thus, as the expense would be too great.

Secante (Sp.).—Drier; tinta de mucho secante, quick-drying ink.

Sechszehner (Ger.).—A form of sixteens. Literally, a sixteener.

Second at Press.—At hand-press, the partner who subordinates himself to the first or leading hand.

Second Form.—In sheet-work, the second side in printing. The first side is white paper.

Seconds Mark.—A double acute accent is used for this purpose, thus: ″.

Secretary.—The name of several kinds of type. The historical Secretary was the manuscript hand employed by the English and Burgundian scribes in the fifteenth century. Caxton used it in many of his works. It is also known as the gros-bâtarde.

Section.—A section consists of two or more sheets folded together so that one leaf will be within another, as sheets of folded letter-paper are nested. If five quarter quires of letter-paper were sewed together and bound the book so bound, in binders' phrase, would have five sections.—*De Vinne.*

Sectional Type.—Type made in two or more parts, each cut off squarely, so that lines of smaller type can be set between the upper and lower sections. A St. Louis foundry shows several varieties.

Section Mark.—A reference mark for foot-notes, thus: §. It is used also to mark divisions in a chapter more important than a paragraph or verse.

Segnatura (Ital.).—Signature.

Segni di Correzione (Ital.).—Marks of correction.

Segni Diversi (Ital.).—Peculiar marks, such as those in astronomy, algebra and medicine.

Seidenpapier (Ger.).—Tissue paper. A fine, glossy quality is used to protect copperplates from friction, &c.

Seite (Ger.).—A page.

Seitenzahl (Ger.).—The folio, the page number.

Selected Parchments.—Picked parchments—those used for writing purposes.

Selected Vellums.—Picked vellums—those used for writing purposes.

Selenotype.—A fantastic background or tint back of a peculiar form, somewhat like a photograph of the craters of the moon.

Semicolon.—A mark of punctuation, being the next more important than a comma. It serves to group together the parts of a paragraph which are most closely allied to each other, and to divide them from those parts which are less closely connected. See PUNCTUATION.

Semikolon (Ger.).—Semicolon.

Sentar la Forma (Sp.).—To put the form to press.

Sentinelle (Ital.).—A letter falling from a form which is taken from a stone or from the press, and which maintains its upright position.

Separatrix.—A long diagonal stroke used in proof-reading to call attention to a mark by its side, and, as its name indicates, to separate the corrections when there are several on a line. Some foreign proof-readers indicate the different corrections, when there are more than one on a line, by adding a stroke at the top at right angles, like a pennant on a flagstaff, one pennant after the first, two after the second, and so on.

Septentrional Types.—The characters used to represent the languages of the North of Europe.

Series.—Type which agree with each other in cut and proportion are said to belong to the same series. There are sometimes ten or twelve sizes to a series.

Serif.—The short cross-line on the top and bottom of a letter, thus: H. The word is spelled by some writers ceriph and seriph.

Serrare (Ital).—To lock up a form.

Set.—1. Composed; completed composition. To set type is to pick up the letters and arrange them as needed in printing. This verb, considered either in the present or past tense, is chiefly used in the printing-office to express the work of a compositor. No printer would say orally that another had composed type, although he might write it. 2. In type-founding, the width of a type. One type may have a wider set than another, although

same body. The height up and down is the size of
dy, and a certain style is said to be of such a size,
wise; so one letter is less or greater than another
se. An en body is on an en set.

t Clean.—Matter composed with few mistakes.

t Close.—Matter composed with thinner spacing
ordinary.

t Foul.—Matter composed carelessly—the reverse
an.

-Off.—The deposition of a part of the ink of a
printed sheet upon another sheet or upon any
substance. When an impression is taken in any
er the ink is fluid or approximately so, and requires
ally several hours and sometimes many days to dry.
first stages simple contact without pressure takes
little of the pigment from one sheet and places it
another, and even after it seems dry pressure will
that it is not completely so. Many contrivances
been used for the purpose of preventing set-off, but
considerable advance has been attained fine work
still be allowed to stand for a considerable time be-
he second side is printed. The methods adopted
eventing set-off are of four kinds. In one the im-
on-cylinder is covered with an oiled paper, so that
the sheet strikes it on the second side there is noth-
r the ink to adhere to. In the second there is an
nediate cylinder covered with paper, against which
inted sheet is pressed. The speed of movement of
cumference coincides with that of the impression-
ler; but it is either larger or smaller, so that the
do not strike in the same place each time. An-
plan is to have a set-off sheet fed in at the time the
is beginning its perfecting movement, and the
is that adopted by Alauzet in Paris and Firm in
ica. In the latter a cylinder of roller composition,
oller in fact, passes against the sheet on its printed
removing the superfluous ink. That roller rests
st a smooth metal cylinder, and this latter is cleaned
loth moving from side to side with regularity and
g it. Thus the metal cylinder is kept clean con-
ly, and the small quantity of ink left upon the
osition-roller can very easily be taken care of. The
is the principal reason why perfecting-machines
t more common in this country.

-Off Sheets.—Special sheets used to prevent the
from sheet to sheet when printed.

Out.—To compose all the type possible to be
ed from a case. One sort gives out sooner than
er, and when no more can be obtained of that sort
at that particular case must be abandoned. There
till be much type left in other boxes.

Up.—To compose. Set-up matter is matter which
en composed.

Wide.—To space wider than the average.

ting-Rule.—In England, a composing-rule.

ting the Headband.—Adjusting the leather in
ing a book in such a way as to form a kind of cap
head-band.

ting the Stick.—To prepare a composing-stick
t a given width of column or page can be set. It
e found in most general offices that there is a vari-
in the width of matter composed by different work-
some exceeding the true dimensions nearly half the
ess of an ordinary lead and some falling that much
. This difference arises from two causes. Some
pace their lines harder than others, but there is
difference in sticks. They are not set to the same
rd. Theoretically all are determined by pica ems,
ica ems differ, and a stick of thirty ems pica set
fifteen two-em quadrats will vary somewhat from
er stick justified to thirty one-em quadrats. There
teen more places for dirt to adhere to the side and fifteen more places for abrasion, the former enlarging the measure and the latter diminishing it. It is therefore desirable when this can be done, as upon newspapers, to make up the measure to a solid slug of brass, used for no other purpose, and having the particular length stamped upon it. The stick should be pressed firmly against this, and no allowance should be made for play. Of course, this must be a little wider than the lead which is to be used in the same measure, as otherwise every lead would bind and lines of type would have no side pressure at all. This increased width should not be more than the eightieth of an inch, nor less than the one hundred and fiftieth. When made up to leads a piece of common light news should be once folded and inserted, and the movable part of the stick pushed up firmly against them. Leads, however, are not a good gauge, as they are cut at different times by different persons, and frequently vary as much as the tenth of a pica. The type-foundries are very remiss in this respect. When the gauge is from pica ems it is better to use the lower-case m's turned sidewise than the quadrats. These are cast of inferior metal and are not so true. An allowance should be made in this for the width of the composed line, which must be slightly greater than the leads which will be scattered throughout, but a less thickness of paper will answer. The lines of type should jut out over the leads just enough, so that when the form is properly locked up the side pressure upon each line and each lead shall be equal.

One great difficulty in setting a stick is lack of trueness. By constant use its sides become abraded, but perhaps not equally. It becomes injured by being strained and by falling. Such sticks should be retrued if it can be done economically; otherwise they should be cast aside and new ones purchased. When the stick is wider at the top than at the bottom a piece of paper can be placed between the movable piece and the lower rim of the stick beyond the screw. When the stick is narrower at the top than the bottom place the piece of paper between the screw and the box end of the stick. Much care is necessary to make these expedients of any value. To tell whether the receptacle for type is really square a rectangular block of the proper width should be placed within. It will fit closely to both sides and the back if the stick is true; if it is not there will be hollow spaces.

Setting-Stick.—In some parts of England this term is used for a composing-stick.

Setzbrett (Ger.).—The letter-board.

Setzen (Ger.).—To set.

Setzer (Ger.).—A compositor.

Setzerzimmer (Ger.).—The composing-room.

Setzfehler (Ger.).—Typographical errors.

Setzlinie (Ger.).—Composing-rule.

Sewall, Samuel, generally known as Judge Sewall, managed the press of Boston for several years, from 1681 to 1684. He was for many years of the Council of the province, and in 1718 he became Chief Justice of Massachusetts. His diary, a most interesting work, has been published by the Massachusetts Historical Society. He died on January 1, 1729–30, aged seventy-eight.

Sewed.—This term is used to designate books which are merely sewed together and pasted in paper covers.

Sewed on Tapes.—Cloth books required to open freely are sometimes sewed on tapes. This is not as expensive as flexible sewing.

Sewer.—The person who sews the sheets together on the sewing press—generally a woman.

Sewing.—Books are usually sewed by attaching each sheet to two or more cords or bands sunk across the back of the book, the bands varying in number and the sheets being more or less secured by the thread, according to the size of the book and the strength and firmness desired. See BOOKBINDING.

Sewn.—A term applied to anything sewn—not stitched or stabbed—in binding.

Sfuggita (Ital.).—An out.

Shagreen.—A kind of strong, granulated leather, originally made in Armenia, prepared from horse and mule hides, now generally imitated; also tanned shark-skin. Shagreen paper, a pressed tinted paper, used especially in bookbinding.

Shake.—1. A slur on a printed sheet through some defect in the impression. 2. With a rolling-press, a mackle or moving of the paper in printing, which produces a sort of doubling in every part.

Shank.—The body of a letter; that part below the face and shoulder; the rectangular part.

Sharp Impression.—Clear and clean impression in printing.

Shaved Leads.—Leads after they have been cast are shaved in a machine, so that they are perfectly true, and can also thus be made thinner than it is possible to cast them.

Shaving-Tub.—A receptacle in a bookbindery into which the cuttings of paper fall.

Shavings.—The pieces of paper cut from the edges of sheets by a plow or by a cutting-machine.

Sheep.—Real sheepskin is seldom used in binding except on law or blank books. What is generally known as sheep is split sheep or bark skiver (natural color). The sheep or library binding, as it is called, is much in use on octavo books, where a full binding is required, and is a medium strong and, if well sprinkled and polished, a very neat and serviceable binding. Sheep binding will not stand very long in a warm and ill-ventilated room, where it will decay and break sooner than goatskin or cowhide.

Sheep's-Foot.—An iron hammer with a claw end.

Sheet and a Half.—Regular sizes of paper made to a size half as much again, to facilitate and economize in working off odd sizes or odd pages. In this country the only kind made for many years has been medium and a half, or 24 by 30 inches, and even this is almost entirely if not wholly out of use.

Sheet Dips.—When a sheet does not lie quite flat and dips into the broken or open spaces of a form, and either blacks or throws the register out.—*Jacobi.*

Sheet the Roller.—An operation necessary in order to take off superfluous ink from a roller. Hard paper is passed around the roller, which discharges the greater portion of its ink upon the sheet.

Sheeted.—This expression is used when heavily printed work has to be placed sheet by sheet between other sheets to prevent offset of ink. This is also called interleaving.

Sheetwise.—When a sheet is imposed so that one half the pages are printed on one side of the paper and the other half on the back it is said to be printed sheetwise.

Shell.—The thin film of copper which forms the face of an electrotype and which is afterwards backed up with electrotype metal to the required thickness.

Shelving.—To undercharge the amount of work done and carry it forward to the next week's bill.—*Jacobi.* Not known in the United States.

Shepard, William Allen, a printer of Toronto, was born in Brownville, N. Y., on July 6, 1830, removing with his parents to Canada in early boyhood. He received his education in the public and grammar schools at Brockville, Ontario, and subsequently taught school for some time in that neighborhood. In the latter part of 1347 he went to Hamilton and apprenticed himself to the printing business in the office of the Canada Christian Advocate, of which his father, the Rev. Gideon Shepard, was afterwards editor for eight years. He became foreman before his time was half served. In 1858, when his father took the position of governor of Albert College, Belleville, Mr. Shepard removed to that town and became editor of the Independent, and in 1859 connected himself with the Belleville Intelligencer, where he was employed at every kind of work. In 1867 it became a daily paper. Its proprietor, Mr. Bowell, had been elected a Member of Parliament, and the whole management, editorial and office, devolved upon Mr. Shepard, who was an able and ready political writer. For five years he was president of the Board of Education. In 1884 he removed to Toronto, taking charge, as part proprietor, of the Mail job office, and with his sons still conducts it. Upon the establishment of a Typothetæ in that city he was chosen as chairman of its executive committee. He was elected a vice-president of the United Typothetæ in 1888, and in 1891 its president. He discharged the duties of that office with distinguished ability, and the next year welcomed the United Typothetæ at its meeting in his own city. He is a polished and eloquent speaker.

W. A. SHEPARD.

Sheridan, Bernard, manufacturer of bookbinders' machinery, was born in Aquackenonck (now Passaic), N. J., on April 17, 1808. In 1830 he entered the employment of R. Hoe & Co., in New York, as pattern-maker, and remained with them until 1835, when he went into business for himself in Gold street in that city, manufacturing letter copying-presses and embossing-presses. He shortly after added cutting-machines in competition with F. J. Austin, who was then the only person in that line of business in New York. He afterwards removed to No. 45 Ann street, continuing there until 1856, when he was succeeded by his sons E. R. & T. W. Sheridan. In 1860 they bought out Mr. Austin and removed to his place, in Reade street, where the present firm of T. W. & C. B. Sheridan is located. The line of manufacture now is very extensive. Mr. Sheridan was married on November 15, 1826, to Grace King of Paterson, N. J. From this marriage there were eight children, six boys and two girls. Six of the children survived him, two having died in childhood. Mrs. Sheridan is still living. He died at the ripe age of eighty-one, that event happening on August 2, 1884.

B. SHERIDAN.

Sherman, Conger, the founder of the house of Sherman & Co., Philadelphia, was born in New Scotland, near Albany, N. Y., on August 7, 1793. Before he was thirteen years of age he entered the printing-office of Barber & Southwick, the State printers, who were also the publishers of the Albany Register. It was a part of his duty to carry to the Capitol the printed bills and journals of the previous day's proceedings of the Legislature, thus frequently meeting the distinguished men of the day, including Governor Tompkins and De Witt Clinton. He had not been indentured, and in 1811 left his employers and went to New York and then to Philadelphia, where he worked as a journeyman until 1830, when he purchased the printing-office of Towar & Hogan, booksellers. With four or five journeymen he began business, printing for the previous owners the Bible and Henry's Commentary. His progress for the first four or five years was very slow. In 1837 he put in his first power-press, the second of the kind for book-printing in Philadelphia. The business has steadily increased until the present time, now being the largest in Philadelphia and one of the largest in the Union. Mr. Sherman sold his interest in 1864 to his son, Roger Sherman, who associated with himself M. F. Benerman and Andrew Overend; but since that time Roger Sherman has withdrawn, and two new partners have been admitted. Conger Sherman died in 1874, leaving a large fortune.

CONGER SHERMAN.

Sherwin and Cope's Press.—An old iron hand-press called the Imperial press. An engraving is shown under the head of HAND-PRESS.

Shillaber, Benjamin P., a printer and author of Boston, was born at Portsmouth, N. H., in 1814. He began his apprenticeship as a printer in the office of the New Hampshire Palladium, at Dover, in 1830; he went to Demerara, South America, in 1835, and stayed there until 1838, and in 1840 was employed on the Boston Post. Five years later he became one of the editors. For this journal he wrote many sketches concerning Mrs. Partington and her boy Ike, which obtained wide currency, and were afterwards reprinted in book form. They appealed very strongly to the sense of the humorous in the ordinary reader. He cultivated the vein thus developed all his life. He published several other books and edited several weekly newspapers after 1850. Mr. Shillaber died on November 25, 1890.

Shilling Mark.—A mark sometimes used in England to indicate the word shilling or shillings, thus 9/ for 9 shillings. It is not customarily used when with pounds and pence, as £41 9s. 3d., but in this case it is expressed as just given. A frequent employment is as 9/6, meaning 9 shillings and 6 pence. The same mark is used to express fractions or the ratio of one number to another decimally, as 4/10, 1/3, or 33⅓/100.

Ship.—An abbreviation of the word companionship—a body of men working together with a clicker.

Shoe.—An old boot or shoe which is sometimes used as a receptacle for battered and broken letters.

Shoot-Board or **Shooting-Board.**—A board or planed metallic slab with a plane-race on which an object is held while its edge is squared or reduced by a side-plane. In any printing-office of size there is always room for one of these to trim up cuts. It is hung up or stood away when not in use, while the plane can also be hung up.

Shooter.—An English name for a shooting-stick.

Shooting-Stick.—The implement used with the mallet in locking up forms. If of metal it has a projection which is placed at the back of the quoin, while another part prevents it from touching the stone. This does not matter with wooden ones.

Short And.—The ampersand, thus: & (Roman), *&* (Italic), & (black-letter).

Short Bar.—The same as SHORT CROSS, which see.

Short Cross.—The shortest and widest of the two crossbars in any chase.

Short Measures.—Those measures of type which are less than sixteen or eighteen ems of the body that is composed.

Short Numbers.—When the edition is small, as two hundred and fifty, five hundred or one thousand.

Short Page.—A page having a line or two less than its fellows.

Short Pull.—When the bar-handle of the press is not pulled over to its full length.

Short Sorts.—When there is a run on any particular letter or letters and they become scarce.

Short Takes.—In order to expedite the getting out of work in composing-rooms the men are often given short portions of copy. These are called short takes.

Short Twelves.—A plan of imposition whereby the pages of a duodecimo are laid down in three short rows of four.

Shorts.—1. Applied to copies printed off short of the number required.—*Jacobi*. 2. A term applied to letters with the short accent over them, thus: ă ĕ ĭ ŏ ŭ.

Shorthand.—A method of writing in which by the substitution of characters or symbols sounds or abbreviations of words are represented, speed being thereby attained in reporting speeches or in transcribing written or printed matter. The present system of spelling has descended to us from former ages, and all of the letters are not now sounded, although they may have been at one time. Thus in the word though there are three unnecessary letters, and if it was not requisite to employ them the word could be easily written in half the time. The word half has one unnecessary letter. Shorthand writers avail themselves of the privilege of respelling in the shortest and most compact form, and using for many single sounds, now written as two, a single mark. Th, ch and ng are thus treated, the word thing being written by them th i ng; course is written kors, write rit, and echo eko. It is supposed that the saving by this is not less than one-quarter. The second economy is in new forms of the letters. A single stroke suffices for each of the consonants, and a dot for a vowel. When a letter can be judiciously omitted it is allowed. This forms the third economy. Dog, for instance, is spelled dg, the vowel mark being introduced for clearness and for separation from dike, which closely resembles it, or from dig or dug; but in a trial about the ownership of a dog or a lecture upon dogs it would be plain enough after the first time without spelling out. The new forms of letters are made in the shortest form possible. M, for instance, in the Pitman system is a convex curve, and n is a concave curve. Thus the word men can be written ⌢‿. The vowel can be added afterwards. All of the present letters require two strokes, as e and l; most require three, as t, r and d; and some require four, as m and w. It will be seen that a shortening of each of these letters to one stroke of itself increases speed very materially, and if to this shortening is added that of contraction of words, suppression of non-emphatic letters and respelling, great additional speed can be attained. Take the fourth verse of the third chapter of St. Matthew:

"Now John himself had his raiment of camel's hair, and a leathern girdle about his loins; and his food was locusts and wild honey."

This would be, as used by stenographers, an arbitrary mark, a star, being employed where no consonant answers to the one in the shorthand alphabet, and a dagger being used for a vowel in the same way:

N† *†n imself hd hz rament v kamelz har, & le*urn gurdl ab†t hz l†nz ; & hz f†d wz lokus & wild huni.

In the one case it will be seen there are one hundred and two letters, and in the other seventy-five. There are many special forms also and many methods by which arbitrary contractions can be recollected. In nearly all systems a striking outline can be remembered, and it is unnecessary to fill out the remainder.

The system most used at the present day is that of Pitman, more or less modified by his adherents. A circle was cut into four parts, and the marks dividing it into these sections were also taken. These were made light and heavy for different consonants. Vowels were indicated by dots and dashes. In the hands of a bright, intelligent man, with good hearing and quick fingers, who is continually in practice, a rapid speaker can easily be followed. A few reporters can even pass considerably beyond all except the most rapid. Ordinary reporters, however, in full practice, fall considerably below ordinary speakers. Incessant practice is required to follow even the slowest.

It is altogether improbable that shorthand as such will ever be given out to compositors as copy, except in special cases. It is read by the editor when written out, but he would not be likely to do it in the contracted state, and compositors would be certain to ask an advance upon composition from such copy. They would also set it up more slowly, and thus forms would be delayed in going to press.

Shoulder-Notes.—Marginal notes placed at the top corner of the page.—*Jacobi.*

Shoulder of Type.—The flat top of the shank of a type from whence the bevel to the face starts. On the top and bottom this is known as the shoulder; on the sides it is the side-bearing.

Shuffling.—Another term for fanning out preparatory to knocking-up work in the warehouse.—*Jacobi.*

Sick Funds.—In many establishments the workmen subscribe so much money each week towards a sick fund. If attacked with illness they receive an allowance from this fund of enough for their weekly expenses. A firm in Warrington, England, Thomas Fletcher & Co., has in operation the following plan: A committee of twelve workmen is elected by ballot annually. Two of these visit in rotation every case of sickness and accident, reporting to the foreman the necessities of each case, and these two, with the foreman, determine what shall be paid, which never exceeds two-thirds of the average wages earned by the recipient. Those subject to chronic diseases are excluded, but the club has power of relief to a certain extent. Every boy earning up to ten shillings weekly subscribes one halfpenny; laborers earning under twenty shillings, one penny, and all others three halfpennies per week. Experience, it is said, shows that out of two hundred persons one on an average is sick or disabled. The firm reports that this plan has worked well, and the funds have never been lacking.

In a certain newspaper office in New York the sick fund is calculated at twenty-five cents a week for all who join the association. As there are about eighty members this gives twenty dollars. Ordinarily an unmarried man will receive ten dollars a week after the first week of sickness, and if the disease is one which requires much care, or there are especial circumstances which demand more, it is given to him. A married man obtains fifteen dollars. Very few assessments are made during the year, the funds of the club being lent out to those workmen who need pecuniary accommodation and who are employed in the same office. High interest is demanded, and the rate thus obtained enables the club to go on with very little cost to its members. Ten cents on each dollar is demanded for each week, the week being regarded as a whole. Thus the workman who after payday, which is on Friday, borrows twenty dollars until next pay-day must pay two dollars for the accommodation. Should he ask for it on Monday or on Thursday he must pay the same sum. This is mentioned to show how easily bad practices spring up. Under the guise of charity the moneyed men of the office act as Shylocks to those less favored. It is supposed that among all ages two weeks' sickness in a year is an average, but for men above sixty three weeks is nearer right.

Side-Lay.—The margin of a given measurement on one side of a sheet in printing.

Side-Mark.—The fixed mark at the side of the gripper to which a sheet is laid in printing on a machine.

Side-Notes.—Marginal notes as distinct from footnotes.

Side Sorts.—The letters in the side and upper boxes not frequently used.

Side-Bearing.—The distance between the faces of two letters, as between d and o in the word dog, and also between o and g in the same word. This must be enough to give all of the lines clearness and to prevent two letters from appearing as one. Engravers and painters can lessen the width when necessary, as well as increase it; but the type-founder cannot. If letters bore off from each other like LA or LT a very thin side-bearing only would be necessary; but many characters are like ML, when two long perpendicular strokes are at the side of each other. A good job compositor, having type the size of great primer and above to work with, can sometimes insert a lead or a piece of card between such characters: but this is impossible in smaller types. Much of the deformity in some fonts arises from the side-bearings not having been accurately calculated, so that on the whole the margins around the letters shall be right.

Sidesticks;—Sloping sticks of wood used in locking up, the quoins being driven against them. They are also made of metal.

Sierra (Sp.).—Rack or straight gearing.

Sigla (Lat.).—Signs and characters frequently used in ancient manuscripts.

Signatura (Sp.).—Signature.

Signatur (Ger.).—The nick of a type; the signature to a form.

Signature.—A figure or letter of the alphabet used at the bottom of the first page of a sheet as a direction to the binder, each sheet having its own letter, as A, B, C. The binder is not, therefore, compelled to examine the numbering of the pages, but simply looks at the signature, which is for his use alone. Other marks are sometimes used to indicate other pages of the same sheet. Signature is also used to indicate a sheet; the third signature of a book would generally be the third sheet. At present figures are more used than letters for signatures. Some printers omit J and others omit U or V in making up their signatures, thus reducing the number to twenty-five. When the list is completed it begins again as AA, and if there are enough sheets it begins again as AAA. The signatures in the first edition of Bailey's Dictionary, the most considerable one of the English language before Johnson's, ended at Cccccc. The book, which was published in 1720, had eleven hundred pages.

The signature should not be at the very end of a line, but indented somewhat. If the page is large a capital is preferable to a small capital. In offices where many books are published in similar form it is well to put the name of the work in an abbreviated form against the signature. In Waldow's Encyklopädie der Graphischen Künste each of the signatures reads thus, for example: "Waldow, Encyklopädie der graph. künste. 14." This usage is good in English also. The signature occurs on st page of all complete forms. An additional sig- is required on the part cut off, which is folded in, odecimos, 18mos, 24mos, 36mos and 48mos. This be denoted by B*, the main sheet being B. If are two cut-offs the last one takes two stars, as: Most forms of 64's and 128's are simply odds and of works imposed together, but cut apart after ng. Each work can be denoted by a mark, as R*, R‡. All that is needed is to give enough for the to distinguish them apart. The signature is on st page of each form and cut-off. Consequently, form is octavo, two being required to complete eet, which contains sixteen pages, the signatures ome on pages 1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, and so on. They are always on an odd page. any reason one must be omitted, as, for instance, a large cut would not allow room, the next signa- eeps up the theoretical sequence; it assumes that issing signature is there. No signature is placed title-page, which is really the place for signature .; nor if there is a bastard title is there one upon age. Page 17 in an octavo, which works and turns, have signature B. The following table shows the signatures when the words octavo and duodecimo nstrued to mean the number of pages in a form in- of the number of leaves. With the latter the signa- in an octavo are on pages 17, 33, 49, 65, and so on. figures are used the letter signatures are not, and ersa:

OCTAVO.

	Figure Sig.	Letter Sig.	Page.	Figure Sig.	Letter Sig.
	1	A	33	5	E
	2	B	41	6	F
	3	C	49	7	G
	4	D	57	8	H

on through the entire alphabet, each eighth page g figures and letters in sequence. When the letter ures go beyond the alphabet the letters are doubled arked as GG, DD, or 2G or 2D, as follows:

	Figure Sig.	Letter Sig.	Page.	Figure Sig.	Letter Sig.
	26	2A	217	28	2C
	27	2B	225	29	2D

DUODECIMOS AND EIGHTEENMOS.

decimos and eighteenmos are marked as follows:

	Figure Sig.	Letter Sig.	Page.	Figure Sig.	Letter Sig.
	1	A	61	6	F
	1*	A2	65	6*	F2
	2	B	73	7	G
	2*	B2	77	7*	G2
	3	C	85	8	H
	3*	C2	89	8*	H2
	4	D	97	9	I
	4*	D2	101	9*	I2
	5	E	109	10	K
	5*	E2	113	10*	K2

SIXTEENMO.

marking for the signatures in the forms now gen- known in printing-offices as 16mos follows. It d be noted, however, that this is really an octavo:

	Figure Sig.	Letter Sig.	Page.	Figure Sig.	Letter Sig.
	1	A	81	6	F
	2	B	97	7	G
	3	C	113	8	H
	4	D	129	9	I
	5	E			

TWENTY-FOURMO.

marking on this is on three pages. The signa- are arranged to place the second one on either the or seventeenth page of the form. If the sheet is to be folded as an 8vo and a 16mo the figure signatures may be used; but if as two 12mos the letter signatures are preferable:

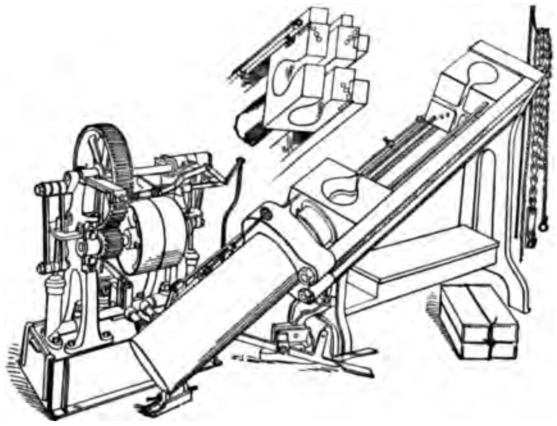
Page.	Figure Sig.	Letter Sig.	Page.	Figure Sig.	Letter Sig.
1	1	A	97	5	E
9	1*		105	5*	
17	—	A2	113	—	E2
25	2	B	121	6	F
33	2*		129	6*	
41	—	B2	137	—	F2
49	3	C	145	7	G
57	3*		153	7*	
65	—	C2	161	—	G2
73	4	D	169	8	H
81	4*		177	8*	
89	—	D2	185	—	H2

Whether 2G or GG shall be used is optional. The older printers employed the latter. Many printers in commercial offices now omit signatures altogether. Before the dawn of printing the scribes placed signatures at the very bottom of the leaf, from which they were generally cut off by the binder when the books were put together.

Signature Line.—The line of quadrats at the bottom of a page in which the signature letter or figure is placed. This is the regular foot-line.

Signature Page.—The first page of a sheet on which the signature appears.

Signature Press.—A device used to press folded sheets before being bound. See BOOKBINDING. The early printers and binders obtained the necessary solidity for a book by beating the sheets, after they had been folded, with a broad-faced hammer, several being treated at the same time. In the middle of the last century Baskerville, a celebrated English printer, heated iron plates until they were hot, inserted sheets of work between them, and submitted them to pressure in a standing-press. Standing-presses had been used before this in many occupations, and even in printing, as the original press used by the Dutch makers of Donats and by Gutenberg was substantially a wine-press, which is of the same theory as the standing-press of to-day. Later than 1780 English printers began to use standing-presses without heat, and about 1800 they were imitated in America; but as sheets grew larger it was impossible to exert enough force, even if the press was entirely made of iron. The hydrostatic standing-press filled the deficiency, and for seventy years has been much employed. Paper, however, must be in a standing or hydrostatic press for a number of hours to efface the marks of impression, varying from twelve to forty-eight. The quantity which could be put into one at one time was only a few thousand sheets, and this could be recharged not more than five or six times a week. The machines were also very bulky. It occurred to a bookbinder of Harrisburg, Pa., J. W. Jones, that if the sheets could be folded and submitted to pressure, either hydraulic or machine, and the compressed bundle tied up and put away, far more sheets could be pressed in a week, and thus much space could be saved. He accordingly invented the Jones signature press. The sheets are folded and evened up, and then placed in the machine. This has a ledge or a rod as a substitute for a ledge on two sides, making a trough, the farther end of the ledges being considerably lower than the upper end, from which the power is applied. A board of the size of the folded paper is placed at the bottom, with the sheets against it in the trough, and then another board. In the hand-machine the screw which gives the pressure is turned by a hand-wheel until the requisite pressure is obtained. Then the bundle, which usually contains about five hundred signatures, is tied from end to end, including the boards. The latter give the necessary evenness and rigidity to the package. The end of the screw fits against a block, which is flat where it presses against the board and paper, but which has a deep indentation in the centre. When the pressure is enough a rope is passed through this aperture and completely around the bundle, passing through a corresponding hollow at the foot of the trough, where there is another block. When the bundle is tied the pressure of the machine is relaxed, and the bundle is taken out and laid at one side. Another quantity of sheets is again inserted, and the operation repeated. The time required is about five minutes for each charge, and the bundles are kept in a tied-up condition from twelve to twenty-four hours; but, of course, if the signatures are not then needed, may be kept until needed in the bindery. There is no set-off. The larger machines employ a combination of gearing and screws or hydraulic power, and the bundles are tied up or secured by larger ropes or by chains, the latter having a catch at the end, so that one part fits into the other and holds it. An evener is used in offices where much work is done, which takes out a great deal of the sponginess by smashing the head-folds to take out the swell, thus enabling them to lie in the trough of the machine without canting.



SIGNATURE PRESS.

PRESSED SIGNATURES FASTENED WITH CHAIN.

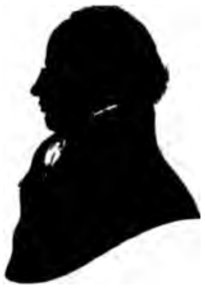
PRESSED SIGNATURES TIED WITH ROPE.

Signo (Sp.).—Sign.

Signs.—Many characters are used in relation to astronomy, algebra, medicine, &c., which will be found under various heads elsewhere. In ordinary work they are little used. It is better in a book on general subjects to say that the thermometer stood at 69 degrees than to say it was at 69°. Few signs are invariable in meaning. They nearly always have different significations in different arts and sciences. Thus * signifies deceased in a catalogue of a college, but paid at the end of a newspaper advertisement. In signaturing it means the cut-offs.

Silbe (Ger.).—A syllable.

Silhouette.—An outline picture in which the object is represented entirely in black. The accompanying portrait is a representation of Dr. Edward Fry, the learned type-founder.



SILHOUETTE.

Silver Bronze.—A metallic powder used for silver printing.

Silver Types.—An expression for excellence in the manufacture of type, used in the first two centuries of printing. It is not probable that letters were ever made of silver.

Silvio (Ital.).—Body fourteen of the Italian series. It is nearly the size of English.

Sine Loco et Anno (Lat.).—Without place or year. This is said of books in which the imprints are deficient in this respect.

Single Cylinder Machines.—Machines in which only a single impressing cylinder is used.

Single Frame.—A frame which holds only a single pair of cases at its top.

Sinking.—Placing a chapter head or a sub-title some distance below the head of a page. In widely leaded books containing only a few words to the page this sinking is deep, perhaps even a third of the whole length; in ordinary works a fourth or fifth is enough, and in some works where compression is desirable a sixth or seventh is sufficient. The running title and the folio are generally omitted. A half title is commonly placed a pica or so higher than the centre of a page, and not in its exact centre.

Sit.—An abbreviation for the word situation; an engagement for work.

Six-to-Pica Leads.—Leads cast six to a pica.

Six-to-Pica Brass.—Brass rule cast six to a pica.

Sixteenmo.—A sheet folded into sixteen leaves—written shortly 16mo.

Sixteens.—A familiar way of expressing a sheet folded into sixteen leaves.

Sixteen-to-Pica Leads.—Very thin leads cast sixteen to a pica, and called hair leads.

Sixtus V., a Pope who has the reputation of bringing forth a book which is, perhaps, as incorrect as any in existence. This was in the year 1590. He determined on publishing a Bible in the Vulgate which should remain the standard text for the Church, and accordingly read every sheet with care. It is probable, however, that his Holiness was a very indifferent proof-reader, for when the first volume came out it swarmed with errors. This might perhaps have remained unnoticed had not the Pontiff, in his desire to retain for the Church an infallible standard, prefixed to this volume a bull in which he excommunicated all printers, editors, &c., who in reprinting the work should make any alterations in the text. The work afforded a great deal of laughter to heretics. To correct the most obvious errors errata were printed on separate sheets, the correct words being cut out and pasted over those which were wrong. The pages, therefore, present a sorry mass of patchwork. Gregory XIV., who succeeded Sixtus, caused it to be entirely suppressed; but Clement VIII., the next in order, printed a new edition. He made alterations in the text, and was therefore a proper subject for the bull of his predecessor. Another pope detected in this last edition two thousand errors and recalled it. He also brought out another edition with another anathema. A copy has been sold of the first named for £50.

Sixty-fours.—A sheet folded into sixty-four leaves. It is also written 64mo.

Size.—A substance used to give evenness to the surface of paper and to fill up its interstices and pores. Newspapers are not sized at all; book-papers a little, but writing-papers considerably. Were it not done on the last the ink would spread far beyond its original outlines, and would pass through the paper unless of extraordinary thickness. The size used in the manufacture of paper is treated of under that head; that used by bookbinders is a very thin glue with some other substances. Zaehnsdorf gives three recipes. The first is one quart of water, half an ounce of powdered alum, one ounce of isinglass and one scruple of soap. Simmer for an hour, then pass through a sieve or piece of linen. To be used while warm. Another is a gallon of water, half a pound of the best glue and two ounces of powdered alum. The third is a stronger solution of isinglass without the soap. Size is also the preparation used for printing with bronze. This is substantially the same as printing-ink with the pigment left out.

Sizes of Paper.—See Dimensions of Paper.

Sizes of Type.—As enumerated in preceding books on this subject, there are twenty sizes used in English and American printing-offices having distinctive names. Above this they are known as four-line pica, five-line pica, and so on until the largest are reached. A different name is known for each size up to double small pica, when it ascends as double pica, double English, double Columbian, double great primer, double paragon, meridian and canon. The names of Columbian and meridian are very little used, and minionette, a size between minion and nonpareil, is also little employed. Several sizes have other names in England, and the appellations there do not always express the same magnitude that they do on this side of the water. The smallest size much used in bookwork is nonpareil, and on newspapers agate. The largest size much used on newspapers is long primer, and on bookwork pica. All other sizes besides nonpareil, minion, brevier, bourgeois, long primer, small pica and pica have their chief use in jobbing, although pearl and diamond are employed on prayer-books, pocket Bibles and such work.

No absolute standard of size exists on any of the old styles of type, although pica, which approximates the sixth of an inch, varies less than the others, and is the gauge for leads, rules and measures. Between the largest picas as made by one foundry and the smallest as made by another there is a discrepancy of nearly one-hundredth. Pica should be equal to two nonpareils, and two picas should be equal to three breviers. Two small picas should be equal to three minions. No rule exists, however, for determining the relation of pica, brevier and nonpareil on the one hand and small pica and minion on the other to each other, and with neither of these is there any exact ratio to long primer and bourgeois. In the type most used in the city of New York, taking 10 as the number of pica ems in a given space, the number of ems of the other sizes would be as follows:

Pica, 10; small pica, 11½; long primer, 12⅓; bourgeois, 14; brevier, 15; minion, 17⅓; nonpareil, 20.

By the new or point system, by which one size progresses to the next in an arithmetical proportion, the magnitudes would be:

Pica, 10; small pica, 11; long primer, 12; bourgeois, 13⅓; brevier, 15; minion, 17; nonpareil, 20.

Several names have been known in the past for various sizes of type which did not exactly conform to the older standards, such as three-line small pica and five-line small pica. Three-line minionette has also been known. A fuller account of this subject will be found under Standards of Type and Type.

Printers call those sizes bastard which have, for example, a small pica face on pica body, or a minion face on nonpareil body. They were formerly much employed, but have now passed out of use. The sizes between pearl and nonpareil, nonpareil and brevier, brevier and long primer, long primer and pica, and English and great primer are also thus designated by some printers, but incorrectly.

Skeleton.—Those kinds of letter in which the lines which constitute the character are very thin and have hardly any weight to them. They may be of Gothic, antique or many other styles, and may be condensed or extended. The following is an example:

This Line is Skeleton Antique.

Skeleton Form.—A form so made up that blanks are left in various places, another skeleton form having letters to print where these vacancies are left. Each form will be printed in a different color.

Skivers.—Split sheepskins, used in binding and in all other leather-working industries. The grain side is used as a skiver and the flesh side is dressed for chamois leather. Skivers are dyed of any required color.

Slab.—The surface on which the ink is distributed; it is generally of marble.

Slice.—A flat, wide iron knife used for lifting ink out of the can.

Slice-Galley.—A galley with an upper false bottom called a slice, used for large pages and jobs.

Slide.—The movable part of the stick.

Slides.—The metal ways upon which the carriage moved in and out on the Stanhope hand-press, known in the preceding wooden press as the ribs and cramps.

Slip.—A cord used in fastening the back of a book.

Slip-Chase.—In England, a kind of long and narrow chase.

Slip-Galley.—A galley used for bookwork with an end and one side. It cannot be locked up.

Slips.—1. Long and narrow pieces of paper. The term is English. Long slips are those cut from the length of a sheet, and short slips from the width. 2. Those proofs which are retained by a newspaper compositor and used in measuring. The more common term now is duplicates or "dupes." 3. The pieces of twine which project beyond the back of a volume after it has been sewn.

Sloping Fractions.—Fractions made so that the bar which divides the numerator and denominator descends from the top obliquely, the figures being at the top and bottom of the bar on opposite sides. See under Fractions.

Slugs.—1. Thick pieces of type metal, ranging in size from pearl to double pica, but in other respects like leads. They are very advantageously used in spacing out, and also as foot-lines. They may also be of brass. 2. Numbered slugs are those slugs which are type high, having in the centre a number or letter. In offices where these are employed each compositor has a slug assigned to his stand. He is No. 1, 2 or any other number as the case may be. When he proceeds to empty his matter he places one of these slugs on the receptacle and slides his matter directly against it. It prevents the top line from falling down and designates the workman who did the composition. After the paper has gone to press, and the matter is measured upon the slips, it serves for an indication to the measurer as to its ownership. The proofs are cut up into as many parts as there are slugs, and each man, taking what he has done on one day and adding it to what he has done on another, pastes the pieces together, the space left for the slug being enough for paste to be applied. "Must," "Absolutely Must," "Reference" and other slugs are also cast, and prove very convenient to the make-up. 3. Slugs to tie up with are a new invention. They have a hollow on one side into which several thicknesses of small cord can be placed. The page is tied up in the usual way, the cord being in this hollow. When placed in the chase the cord is not removed, but the page can at once be locked up, as there is nothing to interfere.

Slur.—When the impression of the sheets appears smeared. This is occasioned by slipping of the paper while the impression is being taken. It differs from a mackle, as that is a second impression.

Small Capitals.—Letters made in imitation of capitals, but of decidedly smaller size. There are twenty-six in addition to the Æ, Œ and &. Many of them bear a close resemblance to the lower-case letters, from which they can hardly be told. Fewer of them are used than of capitals. Only two thicknesses of stroke are employed, the hair-line and the medium. Small capitals are sometimes made to Italic. In jobbing it is common to take Roman capitals, say of long primer or small pica, and justify them in with pica, thus giving them the appearance of small capitals capitalized. The bottom line in both fonts must line. There are no small capitals in German or in Greek.

Small Cards.—A size of card, 3½ by 2½ inches.

Small Court Envelopes.—In England, envelopes to take small post octavo in half, 4¾ by 3¾ inches.

Small Double Post.—A size of printing-paper, 29 by 19 inches.

Small Hand-Paper.—In England, a common machine-made paper, generally straw-colored, used for post-wrappers and such purposes.

Small Numbers.—Short editions, as two hundred and fifty and five hundred, in printing, as distinguished from long numbers.

Small Paper.—When two sizes of paper are used in printing a certain work, the smaller of the two; the ordinary size of paper and type page.

Small Pica.—A size of type between long primer and pica, from which it derives its name. In the point system it is known as eleven points. About six and three-quarters lines make an inch. It is double the size of agate and half that of double small pica. It is largely used for law-books. Besides this, it is a favorite type for works in which a handsome appearance is desirable and which are not compelled to resort to compression. In French this size is known as philosophie, in German as Brevier or Rheinländer, in Dutch as descendiaan, in Italian as filosofia, and in Spanish lectura chica.

This line is set in Small Pica.

Small Post.—A size of writing-paper which is 16½ by 13½ inches.

Smellie, William, a learned printer of Scotland, was born in the city of Edinburgh about the year 1740. He was indentured to Hamilton, Balfour & Neil, and conducted himself so well that he became the corrector of the press before he was out of his time. He had devoted every possible moment to study. In 1758 he produced a Terence in duodecimo entirely set up by himself, which gained his masters an honorary prize offered by the Edinburgh Philosophical Society for the best edition of a Latin classic. Upon the expiration of his indentures Smellie, then only nineteen years of age, accepted employment from Murray & Cochrane, printers in Edinburgh, as corrector of the press and conductor of the Scots Magazine. He continued his classical studies with great ardor, and instructed himself in the Hebrew tongue that he might be thereby fitted for superintending the publication of a grammar of that language. His acquaintance with people of rank and acquirements continued, and in 1765 he entered into business himself with Mr. Auld, his share of the money being advanced by Dr. Hope and Dr. Fergusson, professors in the college. Before this he had pursued extensive studies in botany and chemistry, and had a correspondence with Hume, the historian, upon the criticism made by him upon miracles, in which he denied the assumptions of the philosopher. When Dr. William Buchan issued his Domestic Medicine Smellie saw it through the press, Dr. Buchan living in England, and some parts were entirely rewritten by him. In 1793 he was appointed secretary of the Scottish Antiquarian Society, of which he had long been a member, and this position he held until his death. About this time he published his Philosophy of Natural History, and formed an acquaintance with Robert Burns, with whom he corresponded for a long time. He filled a considerable position in Edinburgh society for many years, and died in that city on June 24, 1794. His last years were burdened with pecuniary troubles.

Smith, James, a Scotch poet, born on March 2, 1824, was apprenticed to the printer's art in his eleventh year. He was an active Chartist, and gave much attention to political questions. He wrote much verse, which went through three editions, and was commended by many observing critics. In 1855 he was appointed manager of Aikman's printing-house in Edinburgh, and soon after brought out his verse in a collected form. In 1869 he was appointed the librarian of the Mechanics' Library, and in 1887, on December 12, he died. He will long be remembered for his poetry, which was peculiarly tender and sympathetic.

Smith, John, was the author of a Printer's Grammar brought out in 1754. This was the first book published in England for the use of the profession. It was copied by Luckombe in 1770 and Stower in 1808, and they in turn were copied by Hansard, Johnson and Savage. The later authorities have also borrowed much from them, even the very turn of the phrase being copied. Smith only went half way through his book, for he says nothing about presswork. He appears to have died in the year 1755.

Smith, Robert Harmer, a printer and electrotyper of New York, was born in that city on April 30, 1824. Shortly after his father removed to Brooklyn, which has ever since been the home of the family. Mr. Smith's father and grandfather before him were stereotypers. The latter, Robert Smith, was employed by C. C. Childs & Son of Bungay, England, at the time when Earl Stanhope was occupied in his attempt to make stereotyping a practical process. Childs was among the first who took up the art and practiced it, and a few years later Smith was employed in various places in teaching the printers of England how to cast and finish plates. Dying before 1820, his son, Thomas Burnett Smith, then a lad of eighteen, emigrated to the United States and began learning the stereotyper's trade with Powell, in New York. He became very proficient, and between 1835 and 1840 established himself in business, and for more than twenty years his was the leading establishment in that line in that city. It had an extensive composing-room attached. R. Harmer Smith originally was in the printing-business, next becoming a bookseller in Brooklyn. About 1853 he entered his father's office at his solicitation in consequence of the death of his brother, whose place it was necessary to fill. He became a member of the firm of T. B. Smith & Son in 1857, a

R. HARMER SMITH.

little time before the death of his father, which happened in December of that year. Mr. Smith continued business under the same title for several years, when he entered into partnership with his foreman, George McDougal, the firm then becoming Smith & McDougal. Mr. McDougal died in 1884, and in 1887 Mr. Smith admitted his sons, Robert B. and Joseph R., under the title of R. Harmer Smith & Sons. The business is now confined to electrotyping and music composition. Mr. Smith took a prominent interest in the first Typothetæ, and acted as its treasurer. On its reorganization in 1885 he took an active part. He was one of the delegates sent by New York to the printers' convention in Chicago in 1887, which formed the organization known as the United Typothetæ of America. His associates were W. C. Martin and Howard Lockwood, now both dead. Mr. Smith was chosen as president of the convention. For a number of years he has been the chairman of the executive committee of the New York Typothetæ.

Smout.—When either pressmen or compositors are engaged for a short time and not for a permanency.—*Stower*. Not in use in America. Franklin knew of it. In a letter he sent to Strahan in 1757 he says: "Our Assembly talk of sending me to England speedily. Then look out sharp, and if a fat old fellow should come to your printing-house and request a little smouting, depend upon it 'tis your affectionate friend and servant, B. Franklin." It differs from subbing in being a short engagement from the house; whereas subbing is when one workman puts on another in his stead.

Soaking Pull.—A long or soaking pull is when the form feels the force of the spindle by degrees till the bar comes almost to the near cheek of the press; and this is also called a soft pull, because it comes down in a soft, soaking and easy manner; and on the contrary the short pull is called a hard pull, because it is suddenly performed.—*Stower*.

Sobrecuadro (Sp.).—Plate to which the platen is secured in some presses.

Society Hands.—In England, those persons belonging to and working under the rules of a trade society (a trades-union).

Society Houses.—Establishments conforming to the rules and paying the recognized scale-price of the various societies (trades-unions) in the United Kingdom.

Sockets.—Pieces of wood nailed upon the hind part of the plank to receive the gallows in a wooden hand-press.

Soft Brass.—Brass rule which can be easily manipulated; specially manufactured for fancy work.

Soft Paper.—Paper which has a soft surface and body, distinct from hard or sized paper.

Soft Pull.—An easy pull over of the bar-handle of a printing-press.

Soft-Sized Paper.—Special printing-paper manufactured with very little size.

Soft Tints.—The lighter parts of an illustration.

Solace.—A penalty imposed by the chapel for the infringement of any of its rules. It is in the form of refreshment.

Solid.—Type composed without leads; not leaded.

Solid Dig.—A lean or bad take of copy.

Solid Matter.—Type composed without leads; also applied to type containing little fat.

Solids.—The blacker or more solid parts of a woodcut or other illustration.

Sombra (Sp.).—Slur or smouch, caused by using very thin ink; sombreada, slurred, smouched; letra sombreada, shaded letter.

Sombrero (Sp.).—Cap-piece of an old wooden hand-press counter-poise in the form of a hat, used on some presses.

Someros (Sp.).—Framework of an old hand-press, which supports the bed, &c.

Sommario (Ital.).—A summary.

Sop the Balls.—An expression formerly used when too much ink was taken on the balls.

Soppressione (Ital.).—A mark to take out, similar to our dele, but which is denoted by an X.

Sopracarichi (Ital.).—Matter smaller than the body of a book, as poetry, notes and extracts; also the extra-price matter.

Sort.—The term applied to any particular letter or letters, as distinguished from a complete font.

Sort Up.—To add particular sorts when boxes are exhausted.

Soundings.—Pressmen are said to be in soundings when they get near the bottom of their heap and their knuckles rap the horse.—*Stower*.

South Carolina.—One of the original American States upon the Atlantic seaboard. Printing began there at Charleston about 1731. There were several printers in that city before the Revolution. The number of newspapers and periodicals published in that State in 1810 was 10; in 1840, 17; in 1850, 46; in 1860, 45; in 1870, 55; in 1880, 82; and 1893, 128. In 1880 four of these were daily, and in 1893 eight were daily. The principal cities for printing are Charleston and Columbia.

South Dakota.—This State of the American Union is one of the divisions of the former Territory of Dakota, where printing appears to have begun in 1870. The whole Territory had in 1880 69 newspapers. South Dakota had in 1893 269 newspapers and periodicals, 16 being daily. Yankton, Sioux Falls, Pierre, Huron and Aberdeen are the chief towns in relation to printing.

Southward, John, an English writer on typography, was born at Liverpool in 1840. His father was a printer, and he became acquainted with a printing-office in his earliest life. He learned to read from the specimens of work posted on the walls there. He was partly educated at the Liverpool College, which he left at seventeen to undertake the editorial management of a local weekly newspaper. In 1868 he visited all of the important newspaper offices in Spain to negotiate for the insertion of the advertisements of a Liverpool manufacturer. He also arranged for the putting up of colored posters throughout the Peninsula. In 1869 he settled in London, being engaged as proof-reader. While doing this he contributed articles to the Printers' Register on the press of Spain. Two years later he was commissioned to write a Dictionary of Typography, which was afterwards reprinted in the United States with many additions under the title of the American Encyclopædia of Printing. After its completion he was employed for most of his time for twelve years in furnishing matter for Bigmore & Wyman's Bibliography of Printing, a truly learned work of great size. He was the editor of the Printers' Register for many years. He prepared a book for compositors and pressmen entitled Practical Printing, which was of great value, and was not founded upon Hansard or Johnson. Lately it has been recast and published as Typographia. To the last edition of the Encyclopædia Britannica Mr. Southward contributed the article on Typography in its practical aspects, Mr. Hessels furnishing the history of the introduction and extension of the art. About three years ago he became the editor and proprietor of the Journal, a periodical devoted to printing. He has done much literary work on subjects connected with the art, in prefaces, introductions and essays.

Southwick, Solomon, a political leader in New York who held important State offices, was born in 1773 at Newport, R. I., and died in 1839. He was bred a printer, was employed in the trade in New York and then in Albany, and then became a publisher. As a politician and editor he had great power.

Space-Barge.—In England, a piece of card or thick paper used to hold spaces on while correcting a form.

Space-Box.—1. The box in which the spaces are contained, nearest to the workman. "To have his nose in the space-box" is to be continually at work without relaxation. 2. In England, a small tray with six or eight divisions—a handy substitute for the space-barge. This contrivance is also used here, but without any specific name.

Space-Leads.—An old term for leads. They were also called space-lines.

Space-Lines.—Leads. The term has now become completely obsolete.

Space Out.—To widen or open out space between words or lines. Every line must have a certain length, of which it generally falls short. It is made of the right size by additions equally along the entire line.

Space-Paper.—In England, another term for a space-barge.

Space-Rules.—Plain or fancy rules cast type high, for filling up blank spaces and dividing sections or chapters.—*Jacobi.* In this country the term space-rule is applied only to lines like those in light brass rule of certain determinate lengths. They are of type metal and are not as good as those of brass, but are far less expensive.

Spaces.—These are the pieces of metal which are used to separate words from each other and to fill out small blanks in lines. As made in America there are three kinds of spaces used in composing, three, four and five em spaces; one used in case of necessity, when words must be got in, the hair space; and the en quadrat, which is really a space. The standard from which they are made is the em quadrat, of which they are respectively the half, the third, the fourth and the fifth. The hair space varies from a sixth to an eighth, and according to good usage ought only to be used in correcting a form after it is made up. Upon galleys matter should be run over rather than use it. The three, four and five em spaces can be used to make many combinations, so that in pica no line need be longer than another by more than the three hundred and sixtieth part of an inch. Thin spaces are sometimes used to set off one letter from another, as in titles, or to increase the length of a line. In German composition they are thus used to denote emphasis, as there is nothing corresponding to Italic in printing-offices in Germany, except the use of a heavier body. They are also used before a j or after an f, and occasionally with some Italic letters in a stereotype page where these occur at the end or beginning of a line, in order to prevent the kerned part from being cut off when the plate is dressed. Some Italic letters crowd against each other so that they also require something to be put between them, and this occasionally occurs in Roman. In the word offhand in most faces a thin space must be put between the f and h to prevent the beak from being broken off. A St. Louis type-foundry recently proposed that spaces should be cut, as to thickness, in point, point and a half, two point, and other point bodies, this applying alike to all bodies from nonpareil to pica. An en quadrat is used between dollars and cents in tabular matter, and in a table which is not crowded it is also placed between the perpendicular rule and the matter nearest to it. The three-em space is the ordinary composing space, but in double-leaded matter the en quadrat is sometimes taken as the basis. A vicious habit formerly prevailed in England, and to some extent in this country, by which the three common sizes of spaces, or at least the three and four em, were mixed together in one box. They were put into the line indiscriminately, and when additions were required at the end of the line other spaces were put in where the blanks were smallest. This was a wrong theory, for the compositor could set no more quickly, while he would lose time in spacing out. That would also be very irregular. Where the most space should be would frequently have been the least. It was a slovenly practice. According to the rule as now followed everywhere, the least space goes after a comma, and the next least between two round letters. Following this between two square letters and the largest between two ascending or descending letters, which are square on the side nearest the other. For instance, between d h more space is required than between o e. After a colon or semicolon an en quadrat is used. To do this spacing more perfectly and to distinguish more exactly the Paige typesetting-machine has eleven kinds of spaces, from the en quadrat down. For stereotype and electrotype work high spaces are generally required. They come up to the very shoulder of the letter.

Spaces can be so combined as to make very minute differences. In pica the differences may be as small as the three hundred and sixtieth of an inch, and in nonpareil half that. The variation in sizes is counted by the sixtieths. A five-em space is twelve-sixtieths, a four-em space fifteen-sixtieths, and a thick space twenty-sixtieths. The difference between three five-em spaces on the one side and a thick space and a four-em space on the other is one-sixtieth of any particular body. Above is given a table showing the number of possible combinations, sixty being an em. They comprise 12, 15, 20, 24, 27, 30, 32, 35, 36, 39, 40, 42, 44, 45, 47, 48, 50, 51, 52, 54, 55, 56, 57, 59, 60, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 78, 79, 80.

In narrow measures in bookwork the compositor may sometimes be compelled to space as high as an em quadrat, but this can nearly always be avoided by running over the previous lines. In ordinary bookwork two thick spaces is the extreme. It is not regarded as good practice to have thin-spaced lines next to those which

COMBINATIONS OF SPACES.

Width of Space.	Alone.	With Five Em.	With Four Em.	With Thick Space.	With Two Five Ems.	With Five and Four Em.	With En Quadrat.	With Thick Space and Five Em.	With Thick Space and Four Em.	Two Thick Spaces.
Five em	12	24	27	32	36	39	42	44	47	52
Four em	15	27	30	35	39	42	45	47	50	55
Three em	20	32	35	40	44	47	50	52	55	60
Two five ems	24	36	39	44	48	51	54	56	59	64
Five and four em	27	39	42	47	51	54	57	59	62	67
En quadrat	30	42	45	50	54	57	60	62	65	70
Thick space and five em	32	44	47	52	56	59	62	64	67	72
Thick space and four em	35	47	50	55	59	62	65	67	70	75
Three five ems	36	48	51	56	60	63	66	68	71	76
Two thick spaces	40	52	55	60	64	67	70	72	75	80

are wide spaced, nor to have a long succession of lines widely spaced. If an em quadrat occurs in the line after a period, and the line is to be spaced out, this should be the last to be enlarged, and if the line is to be thin spaced the em quadrat should be the first diminished. In widely spaced lines, where colons, semicolons, interrogations or exclamations occur, the thin space which precedes one must not be omitted, nor should it ever be enlarged beyond a thick space, even if there is an em and a half between the words. In overrunning matter where cuts are inserted words are sometimes thin spaced between the letters. This, however, should be done only in extreme cases. It is better to have the spacing extremely wide than to resort to this. Job compositors frequently thin space between letters, often to the advantage of the line; when this spacing is no more than the tenth of a letter in thickness it is imperceptible. Some job letters should be set off from others where awkward combinations occur, and it would be an advantage to a page if this could occasionally be done in Roman. It has been suggested that the necessity of wide spacing could be avoided and that perfect uniformity in the distance between words could be secured by the use of thicker letters when required, or the introduction of minute spaces between letters. The difference between an alphabet which measures thirteen ems and one which measures thirteen and a half ems is not perceptible to the eye. If the matrix is a little wider so as to give a little more side-bearing, such a change could be effected. Very few lines, however, have as few as twenty-six letters. An average line in a newspaper will exceed fifty letters, and in a book seventy. If the most used letters are made 10 per cent. wider the gain in a line would be about four letters in the former class of work and six in the latter. Such letters should be those having little shoulder.

Spain.—There is little definite record of the early history of printing in Spain beyond the fact that the art was introduced into Valencia, Saragossa, Barcelona and a few other towns about the year 1574, and struggled on with varying success till towards the end of the last century, when an eminent exponent appeared—Don Joaquin Ibarra—who is reputed to have shown so much taste and skill in his productions that they surpassed in appearance those of other countries at that time, and are still admired as artistic specimens of printing. An apprentice of his, Juan José Sigüenza y Vera, compiled and published the first Spanish treatise on typography, which is said to have been very complete, and contained not only all the information then obtainable, but also specimens of the different faces of type then extant, with their names, &c. It is very difficult now to obtain a copy of this work. It was not until about 1845 that type-founding and lithography were introduced into Madrid by Carl Rosch and Karl Kraus, respectively—Germans, who were induced to go there by a noted printer of that day, Don Manuel Rivadeneyra, who published the Biblioteca de Autores Españoles, an important undertaking, upon which stereotype plates were used for the first time in that country. Rivadeneyra was a very progressive man, and engaged the best workmen wherever he could find them; thus his chief pressman was from France, and his machinist and stereotyper were English. He was the first to introduce the German power-presses, bringing also the best workmen to run them. He introduced several novelties in the casting of his fonts, making logotypes for the most used combinations, such as an, as, on, os, &c. These were not found to work satisfactorily, however, and were soon discarded. Several works on Spanish typography have been issued since Ibarra's, but none of much value. The best at the present time is by Don José Giraldez, published in Madrid in 1884. There is also a fairly good manual for pressmen, by L. Monet, though many of his ideas are somewhat antiquated and apply to presses of French, German or English make, which are almost the only kind used in Spain, and the book itself is about as discreditable a specimen of workmanship as can well be imagined. The condition of the offices generally seems to be half a century behind the age, and many practices are in vogue which would not be tolerated in this country. One of these is keeping job fonts set up in trays instead of cases. The general complaint is that printing is at a very low ebb in Spain at present, as is the case in many other parts of Europe. Local competition and amateurism have nearly ruined what little remains of the business in the general decline of the country. Outside competition, too, has had its effect. It is a somewhat remarkable fact that there are more Spanish works printed in France than in Spain itself, owing probably to the extensive commercial relations of the former with Spanish America. It is said that there are more books printed in either the United States, England or Austria for the South American market than in Spain. This fact has had a very depressing effect on the trade in that country, the sale of home publications being limited almost entirely to their own people, at present a generally poor and non-literary class at the best.

There are many Spanish newspapers in the United States. More are issued in New York than elsewhere, one being daily, five weekly and eighteen at longer intervals. Eleven are issued in New Mexico, fourteen in Texas, five in California, two each in Illinois, Missouri, Arizona and Colorado, and one each in Florida and Ohio. There are sixty-four in all. Some seven hundred are printed in Spain.

Spalla (Ital.).—The shoulder of type.

Spanish America.—The whole of the country south of the United States on this continent, and all of South America, except Brazil, is populated by the descendants of Spaniards, and in these countries Spanish is spoken. The city of Mexico has the honor of being the first city in America to possess a printing-press, which was taken there in 1540, within a century after Gutenberg's great invention. In 1584 the Jesuits founded the first printing-office in South America, in the College of San Pablo in Lima, Peru. In 1600 the art had reached San Domingo; in 1750 the first printing-office was established in Paraguay, and at Buenos Ayres in 1780. Guatemala has 1,500,000 inhabitants and has 20 type printing, 3 lithographic and 20 newspaper establishments. Guatemala, the capital, with a population of 50,000, has 8 book printing, 3 lithographic and 16 newspaper offices. Printing is also carried on in Antigua, Chiquimula de la Sierra, Coban, Huetemango, Pueblo Nuevo, Quezalenango and Totonticapan. British Honduras has one newspaper establishment in its capital, Belize. In republican Honduras, with a population of 600,000, there are 12 printing establishments and 9 newspapers, which are distributed over the cities of Terguci-galpa, Comayagua, Santa Rosa de Copan and Trujillo. Lithography is not represented in this state. San Salvador, with a population of 750,000, has 40 printing-offices and 38 newspapers, but no lithographic establishment. The capital, San Salvador, alone has 25 printing-offices and 20 newspapers, while the following cities have one or two each: Aliquizaya, Chimamenga, San Miguel, San Vicente, Santa Ana, Sonsonate and Suchitoto. Nicaragua has a very extended coast east and west, and with a population of 300,000 has 25 book offices and 50 newspapers, but no lithographic office. These establishments are mostly in Managua, the capital, and Leon, the former capital. Costa Rica, with 200,000 inhabitants, has 15 book offices, 2 lithographic establishments and 17 newspapers, distributed among the cities of Alajuela, Cartago and San José.

Colombia has a population of 4,000,000. It has 110 book offices, 12 lithographic offices and 130 newspapers. The capital, Santa Fé de Bogota, with 125,000 inhabitants, has 21 book offices, 10 lithographers and 36 newspapers. The second city in importance is Santa Marta, with 16 book offices and 10 newspapers. Other printing is done in Bucaramanga, Barbacoas, Cartagena, Medellin, Moupox, Pamplona, Panama, Pasto, Palmira, Popayan and San José de Cucuta. The Argentine Republic has a population of about 3,000,000 and contains 160 book offices, 30 lithographic offices and 260 newspapers.

It might seem somewhat strange that the press had not been utilized by such a progressive people as the Chilians, as it was not until 1800 or 1801 that a small office was removed from Lima to Santiago, and even this had to be conducted clandestinely. The strangeness, however, disappears when the restrictions upon printing in its early days are considered, for in 1560 Philip II. of Spain established the Inquisition there, the chief object of which was to eradicate books circulated by heretics and convicts, as all non-Catholics were called in those times; and in 1647 Philip IV. decreed that in America "no license shall be granted to print books of any kind or quality soever, without first being submitted to the censors." Among the earliest printers in Chili were three men from Boston, Samuel B. Johnson, William H. Burbridge and Simon Garrison, who were induced to go there early in 1812 for the consideration of $1,000 a year. They seem to have had a very stormy time between the revolutions and counter-revolutions to which that country, like all Spanish American communities, has been subject, and one, Burbridge, died from wounds received in a riot which took place on July 4, 1812, at a ball given by the United States consul in honor of the day.

With a population in 1890 of 2,000,000 Chili had 175 printing-offices, of which 30 were in Santiago and 16 in Valparaiso, from which 452 books and pamphlets, containing 38,520 pages, were issued during that year. There were also 31 reviews, 39 daily papers and 166 other periodicals printed. These figures are considered only approximate, as it is supposed many offices did not report. At the present time there are two or three well equipped offices which turn out fairly good work, and at the beginning of 1893 a monthly paper called the Revista Tipográfica was begun at Santiago, but has not appeared regularly. The numbers issued so far have contained able articles relating to the art in that country, and are creditable in appearance.

Spanish Language.—The Spanish or Castilian language is, next to the English, spoken by the largest number of people in the New World, being the national tongue of all the independent republics south of the United States, except Brazil, besides several of the most important islands of the West Indies. For this reason, and on account of the constantly increasing intercourse with those countries and the multiplication of printed works in Spanish issued in this country, it is important for American printers to acquire some knowledge of that language. Being to a large extent directly descended from the Latin, with a comparatively small admixture of other languages, Spanish orthography has preserved to an eminent degree the phonetic character of the mother tongue—a character which has been fostered and improved from time to time by the elimination of unnecessary letters and the simplification of the spelling and accentuation, so that at the present time its orthography is perhaps more distinctively phonetic than that of any other European idiom. While these reforms have been agitated by progressive men in both Spain and America for a great many years, their adoption by the Spanish Academy, the national authority in such matters, was comparatively slow, and some of the American peoples, notably Chili, not being trammeled by any such slow-moving bodies, have surpassed the mother country in innovations in spelling. Of late years, however, the Academy seems to have run to the opposite extreme, for, according to one writer, "reforms have succeeded one another with a rapidity verging on monomania, since in the space of some twenty years it has promulgated three different systems based on diametrically opposite rules. Its eagerness for innovations would indicate that it does not properly consider its work, and it treats the language as though it were a dress that could be changed to suit the fashion or caprice." The last edition of the Dictionary of the Spanish Academy is, indeed, considered by many to have taken a decided backward step by introducing a new system of accentuation, theoretically intended to simplify, but actually having quite the opposite effect by increasing the use of accented letters to an absurd extent. This system, while generally accepted in Spain, and to some extent in America, has encountered much opposition, and the work of the Academy has been so severely criticised as almost to nullify its influence as the authoritative body in matters pertaining to the national language. To show the difference between the practice prior to 1884 and the plan adopted in that year by the Academy a short paragraph is given in each:

Orthography prior to 1884: La adopcion hoy dia, con ó sin razon, de algun nuevo sistema de acentuacion no solo causaria mucho desgusto á los cajistas, porque cambiaria el órden comun que solia seguirse ántes, sino tambien haria mas difícil el escribir á los demas.

Accentuation of the last dictionary: La adopción hoy día, con ó sin razón, de algún nuevo sistema de acentuación no sólo causaría mucho desgusto á los cajistas, porque cambiaría el orden común que solía seguirse ántes, sino también haría más difícil el escribir á los demás.

The above is, of course, somewhat exaggerated, so as to show as many of the accented words as possible; but it will give a good idea of the great increase of marked letters, merely from reversing the previous rule, for the sake of "simplicity."

The object of the extreme reformers has been to have only "one letter for each sound, and one sound for each letter." They would discard all silent letters such as h and u following g or q, omit c and k entirely, substituting q for the hard sound and z for the soft sound of c, and j for the hard sound of g; i is used for y vowel, and all accents not actually necessary are omitted. A piece of composition according to this system would appear as follows:

"I enos aqí jirando en torno de un zírqulo bizioso: el públiqo no azepta la reforma porqe la Aqademia no la a sanzionado; i la Aqademia no la sanziona, porqe el uso públiqo no la a azeptado todabia."

This was too radical for even the American countries, and a compromise plan has been used somewhat in several of the republics, being sanctioned and employed by the University of Chili. This plan retains the h and u silent and c. The foregoing paragraph will then be spelled as below:

"I henos aquí jirando en torno de un círculo vicioso: el público no acepta la reforma porque la Academia no la ha sancionado, i la Academia no la sanciona, porque el uso público no la ha aceptado todavia."

The translation would be: "And here we are turning around in a vicious circle: the public does not accept the reform because the Academy does not sanction it; and the Academy does not sanction it because public use has not yet accepted it."

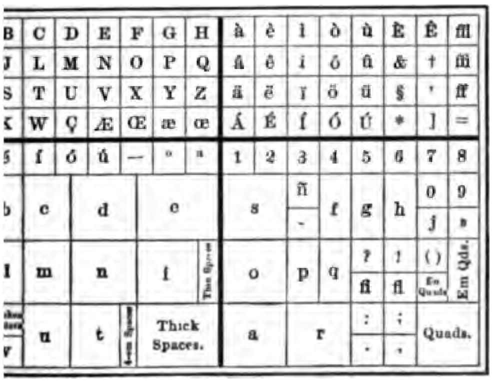
This system varies only slightly in spelling from the former standard, and is very free from accents, making it the most in keeping with common-sense rules, and simpler both for compositors and writers.

The literature of Spain begins with the twelfth century, when the earlier dialects became extinct, and that of Castile, which was the oldest and most powerful province in the kingdom, became the national tongue. The oldest existing document in this language is one written by Alfonso III. in the year 1155. Poetry was the first form in which the people wrote down their thoughts, and the poem of "The Cid," composed about the year 1200, is the first and most important work of this kind, and for centuries it has held its own as unsurpassed in originality and beauty. For a long time the taste of the people was fixed on poetry, principally in the form of s and folk-songs. Prose writing began about 1350, onsisted chiefly in romantic stories rehearsing the rful exploits of the knights-errant; among these ory of Amadis de Gaula was the most popular. tyle of this book was copied to such an extent host of weak and puerile imitators that Miguel ntes was led to write his world-famous Don Quix-hich parodies and ridicules the stories of knight-ry, and is at the same time a model of Spanish

Dramatic works were much more brilliant and ecame extremely popular, many anonymous works ring about the end of the fifteenth century. For a however, dramatic representations were forbidden Inquisition, only strictly religious plays or mys-being allowed; and it was not until the middle of rteenth century that the theatre was revived, and, ing its popularity among the people, produced some most prolific writers who have ever lived. Such ie fertility and originality of Lope de Vega that he l to have conceived and written one hundred dif-plays in twenty-four hours, and his works, which er over two thousand, embrace every branch of the . His rival, Calderon, was fully his equal in the er and value of his writings. It has been only in ratively recent years that history has received attention in Spain, owing, perhaps, to the ten-of her writers to turn from the misery of their it surroundings to contemplate the past greatness ir country. Among modern writers Martinez de sa, Escosura, Serafin Calderon, Gertrude de Ave-a and Castelar are among the best known. Amer-s produced few poets or prose writers of more than ame. George Ticknor's History of Spanish Liter-which is admitted even by Spanish authorities to nost thorough and trustworthy book, is the best on the subject. On Mr. Ticknor's death his library anish books, which is one of the most complete of in that language in existence, was bequeathed to ty of Boston, and is accessible to the public in its y.

anish ñ.—A capital or lower case n with a curly , thus: ñ. The accent is called tilde.

anish Printing.—The Spanish alphabet con-twenty-nine letters, which are the same as in Eng-xcepting that w is not used, and four new charac-ch, ll, ñ and rr—are added. The characters in a f 100,000 letters are divided in the following pro-n: For pica (about 350 pounds), a 6,100, b 1,000,

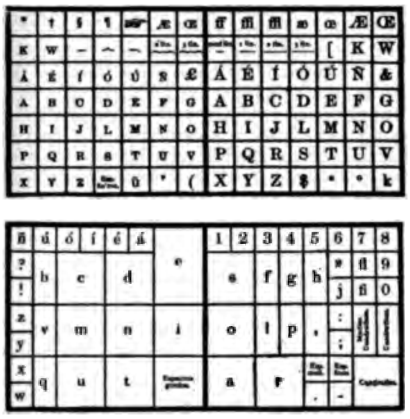

B C D E F G H à è ì ò ù È Ê ffl
J L M N O P Q â ê î ô û & † ffi
S T U V X Y Z ä ë ï ö ü § ' ff
K W Ç Æ Œ æ œ Á É Í Ó Ú *] =
5 í ó ú — º ª 1 2 3 4 5 6 7 8
b c d e s ñ - f g h 0 9 j
l m n i Thin Spaces o p q ? ! ( ) fi fl En Quads Em Qds.
u t Thick Spaces. a r : ; . , Quads.

ORDINARY SPANISH CASE.

00, d 3,200, e 8,000, f g h 1,000 each, i 6,000, j 500, l 3,000, m 2,000, n 4,500, ñ 220, o 5,000, p 1,800, 0, r 5,000, s 6,000, t 4,500, u 5,500, v 1,000, w 50, y 600, z 300, á 450, é ó ú 400 each, í 300, fi 200, ff ffi ffl æ œ ü ' * † § 50 each, . , 2,000, ; 600, : 500, ! ? 300, — 200, other dashes and braces 50 each; A 400, B 250, C 300, D E 500, F G 200, H 100, I 200, J 100, K 50, L 250, M N 200, Ñ 80, O 300, P Q 200, R S T 250, U 400, V 300, W 50, X 200, Y 250, Z 150; 1 300, 2 250, 3 to 9 200, 0 400; Á É Í Ó Ú 50 each. Small capitals one-fourth less than capitals. Only three reference marks are used (* † §), and if more than that number of notes occur on a page the sign is repeated (* *, &c.).

The case generally used in Spain is the large single one, somewhat after the French or German pattern. Nearly every office has its own plan of laying the type, but the one here shown is the most common.

There being no room for small capitals in this case, they must be placed in a separate one like Italic. It will be observed, too, that dashes (except em dashes) and braces are not kept in the case. These are treated as mathematical signs and kept separately. In Spanish-America, where a great deal of the printing material is imported from the United States or Great Britain, the double case is mostly used; but as elsewhere the lay is entirely arbitrary. A Boston manufacturer supplies cases for the Spanish-American market with a slight modification of the usual plan, the lay of which is above shown, and will commend itself to printers having much Spanish composition as being extremely compact and convenient.


* † § ¶ Æ Œ ff ffi ffl æ œ Æ Œ
K W — [K W
Á É Í Ó Ú $ £ Á É Í Ó Ú Ñ &
A B C D E F G A B C D E F G
H I J L M N O H I J L M N O
P Q R S T U V P Q R S T U V
X Y Z ü ' (X Y Z $ k
ñ ú ó í é á 1 2 3 4 5 6 7 8
? ! b c d e s f g h fl 9 j ñ 0
z y v m n i o l p , : ;
x w q u t a r . -

DOUBLE CASE FOR SPANISH.

The type bodies in Spain correspond to the Didot standard, their names and sizes being as follows:

Name.	Points.	Name.	Points.
Diamante	3	Atanasio or San Augustin	13
Perla	4	Texto	14
Parisienne	5	Texto Gordo	16
Nomparell	6	Parangona	18
Miñona	7	Misal	20
Gallarda	8	Palestina	22
Breviario	9	Canon Chica	26
Filosofía or Entredós	10	Trimegista	32
Cicero Chica or Lectura Chica	11	Gran Canon	42
Cicero or Lectura	12	Doble Canon Chica	52

In composition the practice is to use thick spaces between all words, even after a full point. The points are placed close to the letters, and if any spaces are to be put in to justify the line they are first put between the points and the letters next to them, commas included. Division of words of four letters is not allowable except in very narrow measures; and the number of divisions in consecutive lines is usually limited to three. Division on the vowels is to be avoided, unless the spacing would be too wide or too close, and for this reason some of the best Spanish printers have permitted such divisions as ma-es-tro, en-ten-di-mi-en-to, which occur in some works by Ibarra, who carried uniformity of spacing to such an extreme that he had letters cast with a line over them to indicate that another letter had been suppressed. The letters ll and rr must not be separated, as they are considered as one letter only; and it may be taken as a safe rule always to have the portion carried over begin with a consonant. Punctuation at the ends of lines in titles and in display lines and headings is generally proscribed. The rules are generally the same as in English, excepting that all questions and exclamations require the respective points to be inverted at the beginning and upright at the end of such phrases, e. g., ¿ Cómo está Ud. ? (how are you ?), ¡ Válgame Dios ! (bless me !) Some offices, however, omit the inverted point at the beginning. Occasionally, in comedies and in poetry, sentences are found beginning with an interrogation and ending with an exclamation, and vice versa, the object being to indicate some peculiar inflection of the phrase. For quotation-marks comillas («) are generally used, but mostly to indicate extracts or short quotations of the words of others; they are usually repeated at the beginning of every line as far as the extract goes. They are also often used in tabular work in place of ciphers or blank spaces. For dialogues quotation-marks are not employed, but an em dash is placed at the beginning of each paragraph. In conversational matter the puntos suspensivos (. . .) are much used, indicating an interruption in what is being said; in such cases in English an em dash would be employed. The apostrophe is very rarely seen in Castilian; it may be substituted for the comillas at the close of a quotation, however, in fonts which do not have the latter

Capitals are much less used than in English, and adjectives derived from countries, such as inglés, English, francés, French, are always kept down. Even in advertising matter they are only sparingly employed; and it is a common practice in poetry to begin the lines with a small letter in all cases where grammatical rules do not require a capital. Both styles are equally proper.

In setting poetry considerable variety is shown in the method of indenting, but that generally followed is to have the first line of a stanza indented one em more than the rest, as here shown:

Aquí de Cipion la vencedora
colonia fué; por tierra derribado
yace el temido honor de la espantosa
muralla, y lastimosa
reliquia es solamente
de su invencible gente.

When the lines of a piece alternate regularly in different measures the shorter lines are indented more than the longer, as follows:

Son de las desgraciados
las esperanzas,
burbujitas que el viento
forma en el agua;
brillan, y en breve,
por el aire deshechas,
aire se vuelven.

Note references are usually indicated by a figure of the text in parentheses. Small capitals and Italics are used about as in English.

The acute accent is the only one used in Spanish, for although ü occurs after g and q in some words, to show that the letter is sounded, it is not properly an accent. So also of ñ, which is a distinct letter, from which the tilde cannot be omitted. There is at present great lack of uniformity in the employment of marked letters, and each person follows the plan which to him seems best —which is often none at all—so that it is difficult to decide which is the most correct. Speaking of this matter and punctuation, Giraldez says in his Tratado de la Tipografía that "every author and every printer follows a special system; no one is governed by the practice of others, and not only punctuation but also accentuation varies so much that even the Academy, which ought to be an authority, obeyed and respected by all, is followed by very few." The use of the accents over capital letters is rarely insisted upon, and indeed in solid matter they are generally impracticable from the liability to be broken off by the line above.

Spaziare (Ital.).—To space out.

Spaziatura (Ital.).—The various spaces.

Specimen Book.—A book showing the productions of a type-foundry. Moxon issued one of his foundry in 1665, and Oxford University one in 1693. These were both imperfect. Caslon showed in 1734 the entire contents of his foundry, and since that time all English founders have from time to time issued books. In America the earliest was by Binny & Ronaldson, soon after followed by Bruce. Very magnificent specimen books have been published of late years, and the expense of printing them has been very great.

Specimen Page.—In order to decide the shape, size and style of a new work it is usual to submit a sample page; a sheet from a type-founder.

Spindle.—The screw employed to give an impression in wooden hand-presses as used before the Stanhope press. Its total length was twenty-one inches, and the depression made by it in completely turning around was two inches and a half, but in practice only a quarter revolution was made, or only about five-eighths of an inch. The nut in which it worked was in the head, the strong transverse piece of timber just above it.

Spirit.—The evil genius of a chapel.

Spit.—The bar of iron in a wooden hand-press which extended from one side to the other under the bed, and which being revolved by a winch or rounce wound or unwound upon a barrel a strap, this strap pulling the bed under the platen or bringing it back.

Splendider Satz (Ger.).—Widely spaced or leaded matter.

Split Fractions.—Fractions so made that the bar or dividing line is upon the denominator, this line joining a similar line upon other figures, while over each or all of them is the numerator, of one or more figures, which is justified in the centre over them. See FRACTIONS.

Spoilage.—Applied to the sheets spoiled in printing, sometimes called waste.

Sponenti (Ital.).—Superior letters.

Sponge.—A sponge is an almost indispensable necessity in the composing-room, where it is used for wetting type. It does not require to be very costly, and it is generally inexpedient to get those of the largest size. Sponges grow in the sea, attached to rocks, stones and other objects at great depths. They are brought up by divers or dredged by a net, but occasionally they are harpooned. When brought to the surface they are exposed to the air or buried in dry sand until decomposition sets in; then are exposed in wire cages to the action of the tide, and are beaten or otherwise handled until the soft tissues are removed, after which they are washed again thoroughly and hung up to dry, and finally pressed into bales for market. Some are afterwards bleached. The greatest part of the sponges of commerce are brought from the Mediterranean seacoast; the finest from the Syrian and Asiatic coasts and various islands of the Archipelago. Bath sponges are found abundantly on the shores of the Bahamas, Florida and Australia, and in the North Pacific, South Atlantic and Indian oceans.

Spottiswoode Press.—In England, an old platen printing-machine invented by Andrew Spottiswoode.

Spring Back.—In bookbinding, a book which when open enables one to look through the back is said to have a spring back; the opposite to tight back.

Spring of a Form.—A form of type or plates is liable to spring or rise up if not properly locked up.

The remedy is to unlock it and plane it down, then relocking with much care. It is often caused by unequal furniture.

Spring Points.—A special kind of press points which assist in throwing the sheet off the spur of the point as printed.

Sprinkled Edges.—These are mostly used with sheep bindings, school-books, &c., preventing the edges from looking worn or soiled.

Spur.—The short pin at the end of the point which pricks the hole in the sheet for registering purposes.

Spurrell, William, a learned Welsh printer, was born at Carmarthen on July 30, 1813. He was apprenticed in 1830 to J. P. Davies of that town, with whom he remained five years, then going to London, where he was one of the compositors upon the original edition of Pickwick. In 1839 he returned to Carmarthen, where he started on his own account the next year. He manifested a great interest in all public matters, and particularly in those in relation to education. He was the author of a Welsh-English Dictionary, an English-Welsh Dictionary, in which the words were respelled so that Welsh readers could understand the pronunciation of English, a Welsh Grammar and several other books. He took an active part in any improvement in typography, and when the point system was first made known he commissioned the Caslons to cast a series for him on that theory. This was the first order of the kind ever received by a British type-foundry. At the time of his death he was publishing a Dictionary of the Welsh Language by the Rev. D. Silvan Evans, of which the first part, a super-royal octavo of 420 pages, carried the vocabulary from A to Awys. Mr. Spurrell died on April 22, 1889.

Stone Type.—Franz Jurschina, a sculptor of Vienna, has invented a method of producing large types by casting an artificial stone into proper matrices. When dry they can be used at once.

Squabbled.—Composed type which by some accident has been turned around and mingled with other type in such a way that it cannot be proved, lifted or printed. It differs from pied type in the fact that it is on its feet, not having been prostrated.

Square.—This word, when applied to the size of a book, indicates that its shape differs from an ordinary book of the same size in being about as broad as it is high. Both the leaf and the type page are wide.

Square Twelves.—Twelvemos laid down in imposition the short or square way, in contradistinction to long twelves.

Squares.—The portions of the boards which project beyond the edges after the book is cut.

Squashed.—In England a term for squabbled type; unknown in the United States.

'Stab.—A term applied in England to establishment hands—that is, workmen paid by the week and not by piece-work. They are known as weekly hands or office hands in America, and the establishment here is called the office.

Stabbing.—1. To pierce the boards with a bodkin for the slips to pass through, more generally known in England as holing. 2. The operation of piercing pamphlets for the purpose of stitching.

Stabbing-Machine.—A machine used for making the holes through the backs of pamphlets.

Stacks.—Paper or printed work arranged in piles.

Stafford Press.—A small iron hand-press, suitable for working jobs, and in which the platen and tympans were attached to each other and were turned down upon the bed.

Stage.—A wooden platform a few inches high on which stacks of paper or printed work are built.

Staining.—Coloring the edges, fly-leaves and backs of books, either in solid shade or marbling. Staining paper is a euphemism for printing, used as a toast at festivals of master printers in the olden time.

Stamp.—A mark or impression made by pressure, and also the instrument with which such pressure is made. Governments make great use of stamps as evidence of the payment of a tax. Newspapers were stamped in England in 1712, and the practice continued until 1870. It lessened the circulation of these papers very much. In America it was a stamp act which caused the first resistance to Great Britain, resulting finally in the separation of the American colonies from that country and the establishment of a separate government.

Stampa in Oro (Ital.).—To print in gold.

Stampato (Ital.).—Printed.

Stampatore (Ital.).—He who exercises the art of printing.

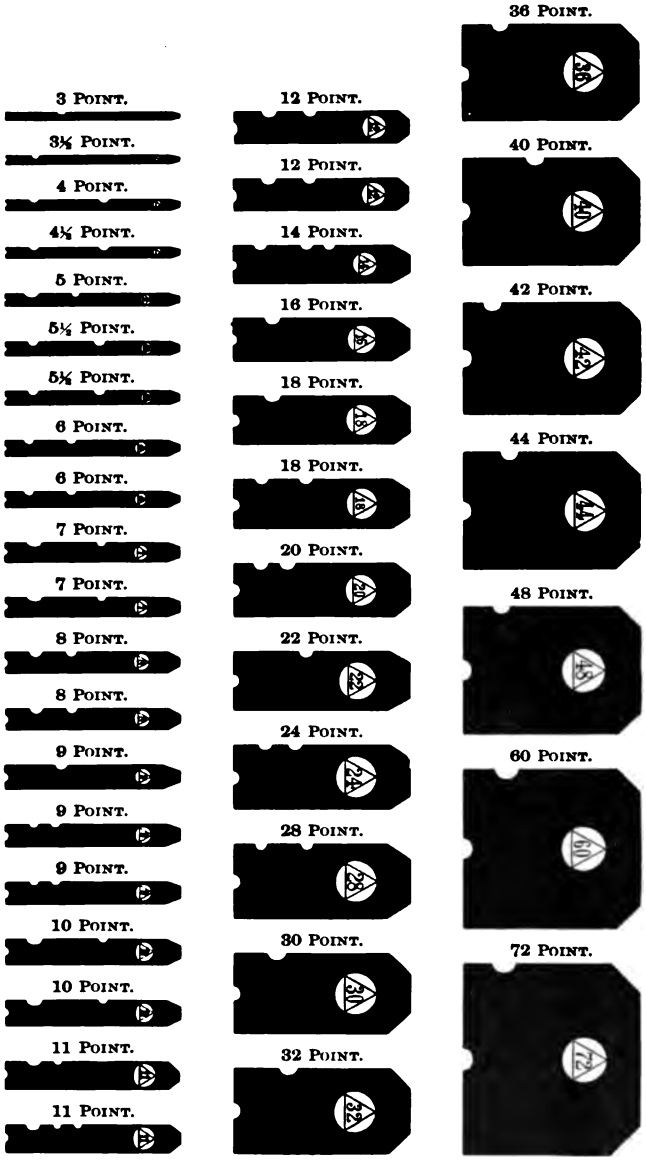
Stamperia (Ital.).—The art of printing or the place where it is carried on.

Stand.—The frame on which cases are placed. A single stand is one at which only one compositor can work, while a double stand affords space for two sets of cases and two compositors. Stands are usually made of wood, but improved iron stands are used in some modern offices. Stands are generally three feet seven inches high at the side next the compositor; the inclined part, on which the lower case rests, being six inches higher at the back than at the front. If the slant is greater than this the types will fall from the upper boxes into those below them when the case is full; and if it is lower the compositor will have farther to reach, besides not being able to take hold of the types so readily when the boxes are nearly empty. The upper case, being higher on the frame than the lower, must have a still greater inclination, yet not so much as to cause the types to become pied. The space underneath is frequently fitted up as a rack for small cases, with a drawer for copy, &c.; or with ledges upon which boards may be placed for containing tied-up matter.

Standard Machine.—A small jobbing cylindrical machine made in England by F. Ullmer.

Standards of Type.—Each size of type differs in body from all other sizes above and below it. The interval has not been alike between type made in different foundries, nor even in the same foundry. It has been the effort, therefore, of those foundries which are conducted most systematically so to grade the sizes that there shall be no variation between letters cast to-day or next month or any other time. To do this an invariable standard must be adopted for each size, and temperature and other conditions must be so carefully observed that a thousand cast one day with a certain metal will agree exactly with a thousand cast another day with another metal. Many difficulties have attended the solving of this problem. Some founders have been content to establish a standard for the pica, long primer, brevier and nonpareil, and others for the seven sizes. Bruce endeavored so to establish his that each size would be, up and down, about 12¼ per cent. larger than that preceding, and contain a very little more than one-quarter more matter. It does not appear that any other American type-founder attempted to fix the relation of one size to another before the introduction of the point system.

The point system is a method of graduating the sizes of type by means of a unit of measure known as a point, which is one-twelfth of the depth of the standard used. In this country the standard is pica, and consequently a point is about the seventy-second part of an inch; in France and other countries of continental Europe it is the twelfth of Cicéro, a size between pica and English, and therefore rather larger than the seventieth of an inch. From the beginning of printing until the last century each type-founder cast his letters without paying any attention to what other founders were doing, and the consequence was that at the opening of this century each of the foundries in Great Britain differed from the others in most of their bodies, nor did any one of these bodies bear any relation to any other, except that in most instances pica was of twice the size each way of nonpareil. Double pica was not two lines of pica together, but two lines of small pica; minion from one foundry would take a thousand words in a page, and from another only eight hundred, and no reason could be discovered why minion, brevier and bourgeois were huddled together while small pica and pica were far apart. The sizes of type bore no relation to the foot, inch or metre, nor did they follow each other in any regular measure of progression. As the type were cast in England, America following the same plan, there were seven sizes for ordinary work, and these were doubled and quadrupled for large letters, and halved for those which were very diminutive. Nonpareil was the smallest and pica the largest regular size. The sizes rose from nonpareil to minion, brevier, bourgeois, long primer, small pica and pica. Were the progression regular in regard to surface each size descending from pica would take a very little more than one-fourth more matter. Thus a page which contained 1,000 words in pica would contain, if the increase was one-quarter, 1,250 in small pica, 1,562 in long primer, 1,953 in bourgeois, 2,441 in brevier, 3,051 in minion, and 3,814 in nonpareil. If the proportion was very slightly enlarged bourgeois would contain 2,000 words and nonpareil 4,000, the other sizes also gaining a little; but in experience this was found not to be the case, and when buying type it could not be said with certainty whether type from a new foundry would be small or large.



SIZES OF TYPE BY THE POINT SYSTEM.

Similar difficulties were long ago encountered by the French printers, and it led to their devising a system which now seems likely to prevail over the whole of the civilized world. Instead of attempting to cause each size to be a certain degree larger than one preceding, taken geometrically, the originator solved the difficulty arithmetically. Cicéro was divided into twelve parts, and each size was indicated by the number of twelfths of which it consisted rather than by its former name. This system was devised in 1737 by Pierre Simon Fournier, called le Jeune, who put it partly into operation, taking as a standard the king's foot, at that time the legal unit of measurement. He constructed an apparatus which he called a prototype, divided into two hundred and forty points, which was preserved in the chamber of printers. His new sizes corresponded, as to the nonpareil, brevier, long primer and pica, pretty closely to the sizes used by English and American founders of the present day. In 1789, however, François Ambroise Didot discovered that Fournier's sizes did not exactly conform to the standard king's foot, either because that had changed or because it had been incorrectly copied at the beginning. He therefore increased Fournier's point nearly one-twelfth, making the Cicéro of the latter about one point larger than the former. This was not a final settlement, for in 1795 the metric system was introduced, and with the view of obtaining a fixed and exact standard by which founders could adjust their matrices Didot, then the most renowned of French printers, constructed a gauge somewhat similar to Fournier's prototype, which he named a typometer, and which contained 288 points. This created great confusion in France. There were then the old sizes, made by founders who had not yielded to Fournier; the Fournier sizes; the Fournier as improved by Didot; and it was now proposed to introduce a metric system. The printers were all up in arms. To placate them Didot was obliged to retain the old nomenclature instead of denominating the sizes by the number of points as at present; but he reduced the number of points in each. Cicéro became eleven point, and so on. His system has now become general in France, and has spread through the South of Europe as well as to Germany and some other countries, but with modifications. The Fournier system is largely used in Belgium. There are two Cicéros in use in France, one the Cicéro de douze, or of twelve points, which is taken as the gauge for all furniture and measures, and the other is the actual type, a pica, which

'en points. The system in France now is to have
on 5 or 5⅛; nonpareil, 6 or 6⅛; minion or brevier,
⅛; bourgeois, 8 or 8⅛; long primer, 9; small pica,
ica, 11; and English, 12.

1843, as we learn from an article contributed by
Cooper to the Printers' Review, Laurent & De-
y, founders of Paris, adopted as a basis 100 points,
to 35 millimetres, which again increased the sizes
rtionately; the plan, however, did not meet with
favor. Meanwhile the German founders were seek-
r more uniformity, and about 1840 several of them
pted to improve on the system in vogue: but all
a fixed and certain basis, as none of them agreed
y with the legal standard of measurement. The
ffort at systematization in Austria was made in
y the director of the national printing-office in Vi-
who adopted as a standard twenty-three Cicéros to
Viennese inches. About the same time Gottlieb
of Prague divided the Viennese inch into eighty-
its (each about equal to two points American), and
o each body a certain number of these units.

en the French founder Charles Derriey brought
s celebrated combination borders in 1830 they were
ed with great favor, and the perfect accuracy with
the various pieces united to form a single design
l the German founders to think seriously over the
tages of a plan that would permit the use of all
of ornaments in combination, and finally caused
l of them to adopt Didot's system definitely. They
d, however, an exact standard as a basis, as there
perceptible difference in sizes even among the
h foundries; but instead of getting together and
ing the Didot system each one went on in his own
some procuring typometers from France, while
were satisfied in adjusting their matrices to letters
red from that country. The result was so much
sion that it was said there were several Didot sys-

It is to the introduction of the combination bor-
nto this country that the anomalous size generally
n as minionette is due. As these borders were cut
éro and its multiples that body was necessarily re-
l, as the strikes or copies could not be adjusted to
ca standard; and many of these borders still show
riations just mentioned, much to the grief of the
ositor who tries to use quadrats and spaces of two
ent fonts together. This difficulty was finally reme-
by a number of the leading founders, under the
ship of Hermann Berthold, adopting in 1878 a
ard based on the metric system. For this purpose
d of the director of the Observatory of Berlin was
in, and it was settled with exactness that 133 non-
s should equal 798 points, or 30 centimetres. This
n was accepted, and each founder concerned fur-
l himself with a standard typometer and regulated
zes to correspond. The others soon found it to
advantage to drop into line and accept Berthold's
n, which was not very difficult, as there were really
ight variations in the matrices. Since 1879, then,
erman typographers and all others using the Didot
n have a uniform standard based on the metric sys-
which is now the standard of measurement in near-
civilized countries, except Great Britain and the
d States. There is, indeed, an accidental coinci-
between a certain size in the metric system and a
n number of American points; but this was not
n at the beginning, and the parity was purely acci-
l. Of the new body 83 picas equal 35 centimetres,
5 picas equal 14 Cicéros.

ormation in England and America proceeded very
y. Fergusson, an English printer, in the early part
century proposed that nonpareil should be made
andard, twelve lines measuring an inch. Fourteen
of nonpareil were to be the common measure for
er fonts; this measure to take in five lines of great
r, six of English, seven of pica, eight of small pica,
of long primer, ten of bourgeois, eleven of brevier
and twelve of minion. This is a very close approximation to type as it is now made on the old system. English, pica and small pica were a little enlarged; long primer and brevier were a little diminished. The next movement forward was made in 1822 by George Bruce, whose plan was to have the type so adjusted that every seventh size would be twice as great, up and down, as the smaller one. To complete his plan it was necessary to add agate, between pearl and nonpareil, and double brevier, otherwise known as Columbian, between English and great primer. His theory has not been adopted by other foundries to any extent. The two foundries which were older than his had nearly the same unit in pica, Bruce differing, and he also differed in sizes in which the others agreed. Job printers felt compelled to buy fonts which would match with their existing quadrats and spaces. Neither did Bruce push his sales as his competitors did theirs. It cannot be doubted, however, that his plan was the most philosophic of all. Each size going down contained about 25.2 per cent. more matter than that preceding. This is very important. In Bruce's system the intervals are regular, so far as face is concerned. There is a marked difference between long primer and small pica, although under the old system they were very close together, and there is only the same degree of difference between nonpareil and minion, although in most foundries the disproportion is great. Between nonpareil and minion the distance is, in decimals of an inch, .0103+; between minion and brevier, .0115+; between brevier and bourgeois, .0129+; between bourgeois and long primer, .0145; between long primer and small pica, .0163; between small pica and pica, .0183. Between some sizes as cast by other foundries the distance is less than .005, and between others over .02. On the new point system the difference between sizes is .0138; the disproportion between minion and nonpareil, instead of being as by the Bruce system, 126.2 to 100, is as 136 to 100; the disproportion between the pica and small pica by the Bruce method is 126.2 to 100; but by the point system it is only 119 to 100. No other plan came up until the point system was begun by Marder, Luse & Co. of Chicago, about 1878.

The French point system was not unknown to American type-founders of the earlier part of the century. An old volume, bearing the computations and annotations of Elihu White, who died in 1836, is in the hands of one of the New York type-founders. In it this system is explained at length. No attempt was made by any early American founder to put a point scheme into operation until after the Chicago fire, when Marder, Luse & Co., who were completely burned out, thought that the time was appropriate for a complete adjustment of bodies on a new plan. The standard size, pica, was divided into twelve parts, each denominated a point. One point was the thickness of a twelve-to-pica lead; two points were of the thickness of an ordinary six-to-pica lead; three points had the thickness of a four-to-pica lead, and four and a half points diamond. Beyond this the agreement of names and numbers was easy. As soon as the plan was promulgated other founders saw its value for advertising purposes, if no more, and the result was that a number soon changed partly to the point system and some did so entirely. It is believed that all of the foundries of the United States now cast type upon the point system when desired, and some have destroyed all their other justified matrices. The result of so many firms taking up a new system of measurement without agreement between themselves, and without conscientious comparison of their gauges with a central standard, was that for some time there were three scales in the point system, several of the foundries deciding that their picas, breviers and long primers were near enough to absolute accuracy to be used without change. This has, however, been rectified, and it is now believed that the only variations are those arising from heat and cold and from personal equation in fixing dimensions. The table of sizes as established and cast by the American Type-Founders' Association is as follows:

TABLE OF DIMENSIONS.

Number of Points.	Size in Inches.	Size in Centimetres.	No. of Ems per Foot.	No. of Ems per Metre.
One point	0.0138	0.0351	867.4699	2845.7143
One and a half point	.0207	.0527	578.3132	1897.1428
Two point	.0277	.0703	433.7349	1422.8572
Two and a half point	.0346	.0878	346.9880	1138.2856
Three point	.0415	.1054	289.1566	948.5714
Three and a half point	.0484	.1230	247.8486	813.0612
Four point	.0553	.1406	216.8675	711.4286
Four and a half point	.0622	.1581	192.7711	632.3810
Five point	.0692	.1757	173.4940	569.1428
Five and a half point	.0761	.1933	157.7218	517.4026
Six point	.083	.2108	144.5783	474.2857
Seven point	.0968	.2460	123.9243	406.5306
Eight point	.1107	.2811	108.4337	355.7142
Nine point	.1245	.3163	96.3855	316.1905
Ten point	.1383	.3514	86.7470	284.5714
Eleven point	.1522	.3865	78.8609	258.7013
Twelve point	.166	.4217	72.2892	237.1429
Fourteen point	.1937	.4920	61.9621	203.2653
Fifteen point	.2075	.5271	57.8313	189.7143
Sixteen point	.2213	.5622	54.2170	177.8571
Eighteen point	.249	.6325	48.1928	158.0952
Twenty point	.2767	.7028	43.3735	142.2857
Twenty-two point	.3044	.7730	39.4304	129.3506
Twenty-four point	.332	.8434	36.1446	118.5714
Twenty-eight point	.3874	.9840	30.9810	101.6326
Thirty point	.415	1.0542	28.9157	94.8571
Thirty-two point	.4426	1.1244	27.1085	88.9280
Thirty-six point	.498	1.2651	24.0964	79.0476
Forty point	.5534	1.4056	21.6867	71.1428
Forty-two point	.581	1.4759	20.6540	67.7551
Forty-four point	.6088	1.5460	19.7152	64.6753
Forty-eight point	.664	1.6867	18.0723	59.2857
Fifty-four point	.747	1.8975	16.0642	52.6984
Sixty point	.83	2.1084	14.4578	47.4285
Seventy-two point	.996	2.5301	12.0482	39.5238

Pearl
Agate.

Pictorially these bodies are represented up to six-line pica on page 520.

The proposed names of these sizes of type were as follows:

Name.	Points.	Name.	Points.
American	1	Pica	12
German	1½	English	14
Saxon	2	Columbian	16
Norse	2½	Great Primer	18
Brilliant	3	Paragon	20
Ruby	3½	Double Small Pica	22
Excelsior	4	Double Pica	24
Diamond	4½	Double English	28
Pearl	5	Five-line Nonpareil	30
Agate	5½	Double Columbian	32
Nonpareil	6	Double Great Primer	36
Minion	7	Double Paragon	40
Brevier	8	Seven-line Nonpareil	42
Bourgeois	9	Canon	44
Long Primer	10	Four-line Pica	48
Small Pica	11		

A comparison of the sizes is given by Hansard, who in 1825 published in his Typographia what he considered the real sizes of these bodies, with the variations of the founders of his day. In his own office he had eight fonts of pica which varied. In a foot they were respectively 71¼, 71⅛, 70¾, 71⅛, 71, 71¼, 71½, 71¼. In Moxon's day the sizes then cast were to the foot in pearl, 184; nonpareil, 150; brevier, 112; long primer, 92; pica, 75; English, 66; great primer, 50; double pica, 38; two-line English, 33; French canon, 17½. In this country the pica made by Bruce and by Farmer could not be made to work together at all. In one font of Farmer's brevier and another of his bourgeois the disproportion is very slight. Twelve lines of one make thirteen of the other.

The variations in size between the type of A. D. Farmer & Co. and MacKellar, Smiths & Jordan (not cast on the point system) and that now made by them and others on that plan can be shown in points as follows:

Name.	Point System.	Old System of MacKellar.	Old System of Farmer.
Nonpareil	6	6	6
Minion	7	7⅛	7—
Brevier	8	8+	7⅞
Bourgeois	9	8½—	8½+
Long Primer	10	9½+	10—
Small Pica	11	10½	10¼+
Pica	12	12	12

The marks plus and minus indicate sizes slightly larger and smaller than the figures alone would otherwise show.

The discrepancy between the sizes as given by Hansard, by the American system and by Bruce is as follows, the figures referring to ems and decimals of an em in a linear foot:

SIZES OF TYPE.

Name.	Bruce.	Point System.	Hansard.
4½—Diamond	201.587	192.771	205.
5—Pearl	179.593	173.494	178.
5½—Agate	160.	157.722	......
6—Nonpareil	142,543	144.578	143.
7—Minion	126.992	123.924	128.
8—Brevier	113.137	108.433	112.50
9—Bourgeois	100.793	96.385	102.25
10—Long Primer	89.796	86.747	89.
11—Small Pica	80.000	78.861	83.
12—Pica	71.271	72.289	71.50
14—English	63.496	61.962	64.
15—Columbian	56.568	57.831	......
16—	......	54.217	......
17—Great Primer	50.396	......	51.25
18—	......	48.193	......
20—Paragon	44.898	43.374	44.50
22—Double Small Pica	40.000	39.430	41.50
24—Double Pica	35.635	36.145	35.
28—Double English	31.748	30.981	32.
30—Double Columbian	28.284	28.916	......
32—	......	27.109	......
34—Double Great Primer	25.198	......	25.50
36—	......	24.096	......
40—Double Paragon	22.449	21.687	......
42—	......	20.654	......
00—Meridian	20.000	......	20.75
44—	......	19.715	......
48—Canon	17.817	18.072	18.33

In this table Hansard's names for double small pica and double pica have been altered, but the sizes are given; these represent the best usage of the type-founders prior to the recent change. When the American system of interchangeable type bodies came up it was objected to as capriciously selected and not answering to any well-known measure of length. It was, however, discovered that 83 picas of the new body were equal to 35 centimetres, and a measuring rod of this length has been made by the MacKellar, Smiths & Jordan Company of Philadelphia, by which the accuracy of any body can easily be tested. It is substantially the same as the Fournier system. The point on the American plan is .0351 centimetres; on the Didot plan, .0376 centimetres. Eleven points and a fifth of the latter equal twelve points of the former. The propriety of taking the Didot standard was considered by some printers and type-founders, but the changes required in fitting up matrices would be too great. Many type slightly larger would look as if leaded, and those on a slightly smaller size would often require a change in ascending and descending letters.

The point system has apparently come to stay. It was regarded in the beginning as an advertising device for Chicago founders, but the quickness with which other foundries elsewhere seized upon it proves that there was certainly much merit in the scheme. It was adopted by the Type-Founders' Association in 1886, and there is an exhaustive report in its favor in one of the papers attached to the report of the proceedings at the convention of the United Typothetæ in Boston in 1890. Its advantages are that the sizes rise by regular gradations, a twelve-to-pica lead added to a nonpareil giving the same depth of body which minion requires, and a six and twelve making it equal to a bourgeois. This is a great convenience in the job-room, but the chief advantage which printers look to is in the fact that spaces and quadrats from all foundries which adopt this plan should be interchangeable, and type of similar face and bodies can also be used together. This has been a great drawback. Not only has one foundry differed from another in its basis fonts, but each foundry has had many sizes. Conner, for instance, casts for the New York Herald an agate which is much smaller than the other agate from that place. It is supposed and believed that these differences will now end. This would certainly prove a great boon to the trade; but the advantages thus gained have not been complete. Printers for a long time will require sorts for their old faces, and these cannot be had if the new system is strictly carried out. The greatest evil it occasions, however, is the lack of proportion between faces. It is a rule, for instance, that extracts shall go in type two sizes smaller than the body of a work. This would give for a pica extracts in long primer, the proportion of words in a given space being little less than five to eight. With brevier, notes would be in nonpareil. By the point system the difference between the former two sizes is so small that the extracts will look as if they are in a small pica; in the latter the difference will be that between an ordinary brevier and an agate. In the former case the proportion will be nine to thirteen, and in the latter nine to sixteen. Discrepancies so great as this necessarily injure the books published upon type thus made. It is probable, also, that the great variation between nonpareil and minion will induce the founders to make type upon a minionette body, or six and a half points. This size is much used in London. In France the size seven and a half is greatly employed, as there was need of a type between seven and eight.

One great difficulty which immediately occurred to all thinking men when this plan began was that sufficient care would not be taken to adhere to the standards. It is believed that one large foundry in the United States is now making pica which varies one line in two hundred and fifty from the true standard, and several experiments within the last four or five years have shown a discrepancy between the productions of other founders who have adopted this system. For the use of a printing-office a stick holding exactly twenty-four picas in length is desirable. After being properly set it can be welded together. In this can be gauged every size of type. It will take forty-eight ems of nonpareil, forty ems of minion and one of brevier; thirty-six ems of brevier, thirty-two of bourgeois, twenty-seven of long primer and three of nonpareil; and twenty-five of small pica, one of nonpareil and one of minion. These tests can be varied in many ways. Only one thing seems to have been lacking—the deposit of a standard gauge at the Smithsonian Institute or some like place, so that not only may there be standards in the hands of the type-founders, but that these may be accessible to the public.

Standing Press.—Screw presses used in the warehouse for pressing. See WAREHOUSE.

Stands High.—In printing, type or blocks which are higher than other types or than the normal height.

Stanhope, Lord.—At the close of the eighteenth century the printing-press remained in about the same form which it had maintained for the two hundred years preceding. Blaew's improvements had put the wooden press in a more compact shape, and Anisson had proved that iron could be much more largely employed than it had been. Anisson's changes never went farther than to make one or two presses for the Royal Printing-Office of France, and there was great need of further improvements. It was at this time that Charles Mahon, third Earl of Stanhope, began his experiments in mechanical improvements in the printer's trade. He was born in August, 1753, and belonged to the same family as Lord Chesterfield. He studied at Eton and afterwards at Geneva, and became so proficient in the French language that at eighteen he wrote an essay upon the structure of the pendulum, which was crowned by the Academy of Stockholm. He later wrote treatises upon electricity, tuning instruments, safety against fire and thunderstorms. He also invented two machines, one of which performed addition and subtraction, and the other multiplication and division. At twenty-one he married his cousin, Hester Pitt, the daughter of the Earl of Chatham, one of his children, Lady Hester Stanhope, becoming famous long after for her eccentricities in the East. Elected a member of the House of Commons in 1780, he avowed himself an ultra Whig, and demanded a termination of the war with America. During the years which followed he was an ardent supporter of the rights of the people. He renounced the peerage, and desired to be known only as Mr. Stanhope. His investigations of the structure of the press began about 1800. He engaged the assistance of an able machinist of London named Walker, and spent large sums of money upon an inquiry into the proper materials to use for inking rollers. In this attempt there was a failure, but not in the manufacture of the press, which was wholly built of iron, and exerted a force six to eight times as great as its predecessor. It was first tried at Bulmer's, known as the Shakespeare Press. He did not take out any patent for this, nor attempt to apply for one for the process of stereotyping, which he introduced to the British world, although he was not the inventor. Stanhope presented himself to Tilloch and Foulis as their pupil, offering them eight hundred pounds. He was assisted by Wilson, a London printer, and in the end they were successful in their experiments. The British public did not take kindly to the new art, however, and in 1812 there were only two master stereotypers in England. Stanhope also invented a system of logotypes, which were never extensively tried, as, although he believed their use would be profitable, he was never able to convert the printers to the same opinion. He wrote a reply to Mr. Burke's Reflections on the Revolution in France; a refutation of a Plan for a Sinking Fund, which had been proposed by Dr. Price, and an Essay on Juries. He died on December 15, 1816.

Stanhope Press.—The first English iron press. It was the invention of Lord Stanhope, a nobleman who devoted much time to the useful arts. A Frenchman, Anisson, had in the year 1785 made an improved press either wholly or almost entirely of iron, but as it was made for the king's service it attracted little attention. Lord Stanhope saw the weakness of the common wooden press, which gave no more power than could be derived from a lever three feet long, for the turn of the screw was only a quarter of the way, and yet it depressed the platen as much as was necessary, or five-eighths of an inch. Obviously this power was very little. Yet with wood it was impossible to build a press which could stand much more strain than this. The resistance was derived from the head above, which was a block of wood ten and a half inches thick, and below from the winter, another block nine inches thick. These were each fastened into the side posts by tenons two inches square. That which could overcome the resistance of these tenons would break down the press, and as a matter of fact presses were frequently broken down. Stanhope's changes consisted first in making the press of iron; second, in making the bed larger and discarding the stone; third, in making the platen nearly as large as the bed; fourth, a method of increasing the power of the bar; and fifth, a more powerful screw. Judging by our present knowledge a more homely press than the Stanhope was never invented. It was made strongly but awkwardly. The frame which answered to the former cheeks, or upright posts, was of cast iron of great thickness, joining at the bottom, but not at the top, and bowing out prodigiously in the centre. Here was an oval opening, through which the bed ran backward and forward. The platen descended by a screw which, a large and powerful one, was turned by a lever, and this again by another lever, but so contrived that the power was continually increased. This again was moved by the bar pulled by the pressman. The supports to the bed, known as the carriage, were got rid of, and the bed was moved upon two ways very similar to that of the present Washington press. The whole was sustained upon a massive frame of wood. Many advantages were immediately seen in this press. It printed a sheet twice the size that could be attempted before; only one pull was required, no matter how large the form, and a neater and surer impression could be made. Lord Stanhope refused to take out a patent upon this improvement, and consequently other makers soon took hold of it. The first manufacturer was Walker. Many of the master printers and joiners attempted to engraft its principles upon the preceding wooden press, but that was unfitted to receive more power, and many presses of the kind speedily broke down. The Stanhope press was soon followed by those of D'Eighn, Shields, Cogger, Ruthven and Stafford. They were, however, nearly all superseded by the Clymer, and that and the Albion are now the leading hand-presses in Great Britain. In America the Shields press was first offered for sale, but iron presses were not made before the Wells, the Stansbury and the Smith, the first two anticipating the other by about two years. Shields offered his press for sale in New York in 1811, and in 1816 several of the daily papers in that city had iron presses, undoubtedly imported from abroad. The Stanhope press was never used to any extent in America.

Staple.—The iron framework of the Stanhope hand-press, which answered instead of the cheeks, feet, head and rails of the former wooden press.

Star.—An asterisk, thus: *. It is the first reference mark, and is followed by the dagger. Two or more stars indicate a hiatus, or the suppression of a name. A considerable omission is denoted by a line or lines of stars. In some books and some newspapers a change of subject, greater than can be indicated by an ordinary paragraph, is shown by three stars in a shape like that of an inverted pyramid: *⁎*.

Star Chamber.—The decree of the Court of Star Chamber of July 11, 1637, limited the number of type-founders to four, no one to have more than two apprentices; twenty printers were to do all of the printing; no joiner could make any press; no smith could forge any ironwork for a press; no person could bring from beyond seas any letters founded or cast for printing, unless with special permission. This act was revived again and again until 1683, when it expired by limitation.

Star Press.—A job press, made at Palmyra, N. Y. It has a throw-off and a dwell for feeding.

Start.—When any of the leaves are not properly secured in the back, and they project beyond the others, they are said to have started. When the back has been broken by forcing the leaves they start.

Statements.—Blank printed bills or billheads presented monthly or at other stated intervals, setting forth the indebtedness of customers.

Stationer.—1. One who sells the materials used in writing, as paper, pens and ink. At the present day, however, he sells almost all small articles which are compact and neat.

2. In England a wholesale stationer is a paper dealer.

3. (Obsolete.) A bookseller or publisher.

The booksellers of the earliest period received the title of stationarii, or stationers, from their stations or shops. They not only sold books, but many of them acquired considerable property by lending out books to be read at exorbitant prices, not in volumes, but in detached parts, according to the estimation in which the author was held.

The most commonly sold articles in a stationer's at the present day are albums, arm-rests, rubber bands and rings, backgammon, chess and checker boards, baskets, alphabet and kindergarten blocks, blotters, book-covers, boxes of paper, tin and japan; cards, carbon paper, clips, copying-books, copying-presses, corkscrews, cutlery, crayons, cases, cribbage boards, chips, dampening bowls, desk pads, desks, dice, dominoes, drawing instruments, envelopes, erasers, files, folders, globes, hand-stamps, inks, inkstands, key-rings, lead pencils and leads, letter-trays, lunch-boxes, mucilage, music wrappers, oiled board and paper, pins, pads, pad-holders, paper-cutters, paper-fasteners, penholders and pens, paints, paper, paper-weights, slate pencils, rubbers, rulers, scales, school-bags, sealing-wax, seals, shears, slates, sponge-cups, straps, suspension-rings, tags, tape, tape-measures, toothpicks, tracing-cloth, wafers and wire. Many stationers also have news-rooms and bookstores, and some unite toys with their other business.

Stationers' Company.—The guild of stationers in London, or those stationers, printers and booksellers who are united together in a chartered organization of that name. The company is considerably older than the invention of printing, but received its charter from Philip and Mary in the year 1556. It was made a guild of the city in 1403. It has a hall in which for many years a feast of the trade was held, and in it are a number of pictures of eminent stationers and printers. Several valuable privileges have been granted to them, and they have considerable property, while several charities are under their control.

Stays.—Projecting pieces of metal which are used in a Stanhope press to hold the cup or socket in which the screw acts firmly upright.

Steam Printing.—Any kind of printing executed by means of steam-power—the reverse of hand-work.

Steel or Copperplate Engraving.—This is a method of making engravings by cutting, scratching or corroding a plate, these incisions afterwards being filled with ink, the upper surface of the plate wiped clean, a sheet of paper laid upon it and the whole subjected to great pressure in a rolling press, which touches only one part of the plate at once, the whole passing under it in succession. When the sheet is taken off it will be found that no matter how delicate the lines they will be faithfully reproduced, while the ink has been forced upon the surface of the paper in such a way that it stands up in ridges. When it dries it will give a greater blackness than can be obtained from lines of the same size in a wood-engraving. There the pressure spreads the line and makes it wider and the ink thinner. It is said, and has been the general belief, that Finaguerra, an Italian goldsmith, invented this method of engraving about 1460. It is certain that the art was practiced at this time, although the historians have nearly all given up the attempt to connect its discovery with a particular name. The art of working in metal and of engraving ornaments upon the surface of gold, silver and bronze had then attained a very high degree of excellence, and when the discovery was once made that incised plates would yield a multiplicity of impressions upon paper it seemed to leap to perfection at once. In letter-press printing, provided the public would buy the books after they were printed, it would be easy for any well equipped office to surpass in imitation the best works of the early press, although that speedily reached a high point of excellence; but except in minuteness we have not advanced beyond the copperplate engravers of the cradle century. This art, as commonly carried on, is one which has suffered less change than any other. The tools are like those first used; the rolling press was then adopted; the workman wiped the plate in the same way; and his production is no greater, day by day, than it was then. In bank-note printing and in commercial work a new machine has been brought in, but our Government still prints its bank-bills as Finaguerra might have printed them.

There are five kinds of steel or copperplate engraving. Line engraving is considered the most excellent, as it is the most difficult. In this, with a sharp tool called a graver, lines are drawn in every place where an impression is needed, these lines being continuous or nearly so. Sometimes they are mixed with dots or stipples, particularly in portrait engraving, where the face is represented by stippling and the sky, the furniture and the clothes in lines. In the lower grades of portraits nearly all of these lines are done by the ruling-machine, which performs its work with far more rapidity than the most skillful engraver. Etching is the opposite extreme to line-engraving. It is not formal and precise, and does not necessarily finish every mark. The plate is covered with a coating through which the design is cut. This can be done very speedily in comparison with other engraving. When this is accomplished a corroding acid is poured upon the plate, which eats away the metal where the plate has been laid bare. As the acid cannot be made to act with perfect regularity, there will always be a certain roughness about an etching. It is now very popular, although many etchings of the present day are really destitute of artistic merit. In stippling the effect is produced by minute punctures. As these are greater or smaller, or more or less close together, the effect of light and shade is produced. The effect is delicate and pleasing. Mezzotinto has for its basis a plate which has been artificially roughened by a grounding-tool. This passes backwards and forwards over the whole surface until the punctures are so numerous that if a proof were taken it would seem to be entirely black. Having made these indentations with perfect evenness the artist proceeds with a burnisher and scraper to rub down the places where he needs a light, leaving the dark parts as they were. If a place is not to be printed at all the roughness is all rubbed out; for less light less is rubbed out. This method is not so much in favor as it was. It can be quickly executed after the ground is made. In aquatinta the plate is roughened in a somewhat similar manner by finely powdered mastic, upon which acid is poured. By this a sort of graining is produced. When enough has been done varnish is put on over a part, so that the next application of acid will not affect the portion where it is applied. Etching is used to lay the general outlines, and the roulette, a wheel to make indentations in mezzotint, is also employed. The most common metals upon which engraving is done are steel and copper, although many others have been used. Copper is hard enough to stand the press and soft enough to be engraved upon. Steel was too hard and intractable until a method was found of taking out its temper and making it soft until the engraving was completed, when it could again be hardened. The plate is rather thicker than an ordinary stereotype plate. A copy can be taken of it by electrotyping, so that it can be duplicated or triplicated. This is very necessary in modern engravings, as to save work the lines are very shallow and the plate shows signs of much wear when only four or five thousand impressions have been taken. Old plates can be touched up by the graver; but unless a great deal of time is occupied in it and much care taken the plate will be very unequal. In most plates there is a mixture of two or more processes. A copperplate wears out on two or three thousand impressions, and even much sooner if the engraving be fine. Few letter-press printing-offices have an engraving adjunct, and most engravers send their work away to be printed. Line-engraving is rarely done except by professional engravers, while the bulk of etchings comes from persons who do not follow this art for a living. They are painters or sculptors, or persons with a taste for the fine arts.

In making an engraving a variety of tools is required. The principal one in line-work is the graver or burin, which is square at the point for the cutting of broad lines, and lozenge for the finest, and must be tempered to that exact state which will prevent the point from breaking or wearing by its action on the metal. The graver is inserted in a handle of hardwood, resembling a pear with a longitudinal slice cut off, which is to enable the artist to use it as flat on the plate as his fingers and thumb will permit. This instrument is used for removing the imperfections discoverable in etchings, and exclusively in engraving signatures and other writing. In working, this instrument is held in the palm of the hand and pushed forward so as to cut out a part of the metal. The scraper is a long, triangular piece of steel, tapering gradually from the handle to the point; the three edges produced by this form, being sharpened on the oil-stone, are used for scraping off the roughness occasioned by the graver and erasing erroneous lines. The burnisher is a third instrument of steel, hard, round and highly polished, for rubbing out punctures or scratches on the metal. The oil-stone is required for sharpening. To these may be added the needle or dry-point, for etching and making those extremely fine lines that cannot be made by the graver. It is held in the fingers in the same way as a pen or pencil. Various kinds of varnish, rosin, wax, charcoal and acids are likewise employed in different parts of the operation, according to the subject and the method of engraving which is adopted. In line-engraving, to trace the design intended for engraving accurately on the plate it is usual to heat the latter sufficiently to melt white wax, with which it must be covered thinly and equally, and suffered to cool; a drawing is then made in outline with a lead pencil upon a sheet of paper, which is laid with the pencilled side upon the wax and the back rubbed gently with the burnisher, which will transfer the lead to the wax. The design must next be traced with an etching-needle through the wax on the copper, when, on wiping it clean, it will exhibit all the lines ready for the graver. The table intended for engraving on should be perfectly steady. Great care is necessary to carry the hand with such steadiness and skill as to prevent the end of the line from being stronger and deeper than the commencement, and sufficient space must be left between the lines to enable the artist gradually to make those stronger which require it. The roughness or burr occasioned by the graver must be removed by the scraper, and the surface of the copper cleansed, in order that the progress of the work may be ascertained. If any accident should occur by the slipping of the graver beyond the boundary required, or lines are found to be placed erroneously, they are to be effaced by the burnisher, which leaves a hollow. These must be leveled by the scraper, rubbed with charcoal and water, and finally polished lightly by the burnisher. The back is also beaten up. As the uninterrupted light of the day causes a glare upon the surface of the steel or copper hurtful or dazzling to the eyes, it is customary to engrave beneath a shade of silk or tissue paper stretched on a square frame, which is placed reclining towards the room, near the sill of a window.

Such are the processes and means to be employed in engraving various subjects; indeed, the graver is equally necessary for the remedying of imperfections in etchings, to which must be added the use of the dry-point in both, for making the faintest shades in the sky, architecture, drapery, water, &c.

Steel-Plate Printing.—Printing done from a plate of steel into which lines have been cut. It is the same as copperplate printing, the paper being wet.

Steel Quoins.—A patented mechanical contrivance for locking up forms by means of a key applied to shaped pieces of steel which fit into a kind of rack.

Steel Rules.—Composing-rules made of steel.

Stege (Ger.).—Wooden blocks used in printing for filling out blank spaces between type; reglets.

Stem of Letter.—The up and down strokes of any letter.

Stencil.—A plate or sheet of any material with the pattern cut out so that by the aid of a color-brush the figure can be marked upon some surface beneath.

Stereo.—An abbreviation much used in England for stereotype, although little employed in America. Electro is also used there for electrotype.

Stereotipa (Ital.).—Stereotyping.

Stereotype Apparatus.—The machinery and tools necessary for stereotyping.

Stereotype Blocks.—Blocks on which stereotype plates of books are temporarily fastened when they are printed. Small or unusually large plates are blocked or permanently attached to blocks of wood of such thickness that when it is added to the thickness of the plates type height is formed; but to avoid bulkiness and unnecessary expenditure stereotype blocks of the various regular sizes are made to support in succession any requisite number of stereotype plates of pages of books. These blocks are usually of mahogany, bound with brass, and they have catches or claws to hold the plates firmly in their true position, so arranged that they can be conveniently tightened or loosened by a ratchet.

Stereotype Catches.—Short pieces, generally of brass, with a shoulder for holding plates in the required position.

Stereotype Chases.—Special chases made for use in stereotyping.

Stereotype Clumps.—In England, the type-high pieces of metal which protect the edges of pages and form the bevel of the plate. In America they are known as guards or bearers.

Stereotype Flong.—The prepared paper which forms the matrix or mold for stereotyping by the paper process.

Stereotype Furniture.—Metal furniture used for stereotyping purposes.

Stereotype Metal.—The metal used for stereotyping, as distinct from type metal, which is of better and harder quality.

Stereotype Metal Blocks.—Metal risers or blocks on which to impose stereotype plates.

Stereotype Pins.—The brads or French tacks used for fastening stereotype or electrotype plates on blocks.

Stereotype Wooden Blocks.—Wooden blocks with brass catches on which stereotype plates are mounted—distinct from metal blocks.

Stéréotypie (Fr.).—Stereotyping.

Stereotyping.—The art of producing from woodcuts or pages of type in relief a solid block or plate which is an exact replica of the original. It is usually done by casting, but in ELECTROTYPING (which see), a species of stereotyping, it is produced by galvanic action. In ordinary stereotyping a mold is taken of the page of type, which, when dried, is used as a matrix in which to cast type metal or a metal somewhat resembling it. This being trimmed, shaved and mounted upon a block, is used for exactly the same purpose as the original. It releases the type and allows the stereotype from it to be kept as long as desired before printing. It is much more compact than the type, five pages of plates occupying only the space of one page of letters, and if the chase and margins are taken into consideration only one-tenth. Letters do not fall out, and by waiting until a book is nearly completed form after form can go on the press without having other work come between, to the decided advantage of its appearance and also with much economy. It is unnecessary with stereotype plates to print large editions, as was formerly necessary when type alone was used, in order to save recomposition, as the pages can be put on at any time without extra cost, and the investment in printed sheets years before they are needed is unnecessary. The average page in bookwork, taking that for a duodecimo in long primer, will cost a publisher in our large cities an average of a dollar; a stereotype will require about thirty cents more. Should he desire to keep the book standing in type it would cost him over three dollars for each page. There is thus a decided economy in stereotyping and electrotyping. The latter operation has driven out the former, except in a few cases, for bookwork; but newspapers are stereotyped in a method unknown fifty years ago. Electrotyping is more delicate and the lines are sharper and better defined.

Before the invention of movable types printing was executed on blocks of wood upon which words and pictures were engraved. The merit of the discovery of Gutenberg was that a letter once having been used in one place could be employed elsewhere; that, for instance, the letters in eat could be recombined as tea. There were, however, advantages to publishers in wooden blocks, which were treated exactly as we now treat stereotypes. A primer engraved on four pages could be placed on the press, the workmen proceeding for a week, and then taking it off. A small edition was then ready. A year from that time the form could go on again without recomposition. So great were the advantages of this plan that block-books were designed, engraved and printed long after movable types were used all over Europe. It is by no means certain that they were abandoned until after the beginning of the last century. Even to this day printers in remote country towns in America cut words and lines, such as "auction," "vendue," and so on, to save composition and the purchase of large type. No doubt many printers attempted in early times to obtain casts or to solidify their pages of type; but the first recorded effort at stereotyping was by a bookseller in Leyden, Van der Mey, in conjunction with a clergyman, Johannes Müller, towards the close of the seventeenth century. They prepared the pages for a quarto and a folio Bible by soldering together the bottom of the types to the thickness of three quires of writing-paper. Several other works were thus prepared, and pages from them were preserved until within a few years. Gabriel Valleyre, a printer of Paris, produced about the year 1700 numerous calendar plates, the material being brass, which was cast into a clay or loam mold. The method of casting type metal in molds of plaster-of-paris seems to have been discovered by William Ged, a goldsmith of Edinburgh, who in 1725 began his experiments. They proved successful, but he could not get the printers to use his plates, and he was unfortunate in money matters. From that time on numerous experiments were made. One was by Michael Functer, a printer of Erfurth, who followed in the lines of Ged in 1740; Joseph Hoffman was a second. In 1783 he made molds of plaster and clay, cemented by gelatine, gum or starch. Andrew Foulis of Glasgow in 1784 was casting plates regularly with the co-operation of Alexander Tilloch of the same place.

In France another theory of stereotyping was tried. The form was driven into melted type metal just at the point of solidification. As the page driven in was cold this caused the hardening of the fluid more quickly, and it in turn became a punch for a second impact against melted type metal. This required excellent judgment as to the time when the proper conditions existed, and there must necessarily have been many air bubbles. Upon this plan were produced the plates for the assignats, or French paper currency of that time. It was known as polytypage. Didot, who was responsible for the introduction of this method in Paris, also cemented together pages of type so that there might be no error in working from them or handling them. Another plan was to make a matrix by printing the types against a sheet of soft lead. Unless the form is large this can be done very easily. Copper was also used as a material for the matrix of a page. A page having been set up in ordinary type, the punches which were the parents of these letters were driven in succession by machinery into copper. When one punch had been driven in the plate was moved a trifle, and the next one was struck. When the whole page was completed, a very tedious operation, the plate would serve as a matrix for stereotypes. A similar plan is now used in some typesetting (typecasting) machines to make a matrix from wood. Another ingenious novelty was the employment of female or matrix types. The shoulder and hollow parts of these letters were in relief, so that when a casting was made they indented the plate where that should be indented and left the parts which were to be printed from standing up. The page having been set up in these female types, a proof could be taken and the matter read, after which the form was shut up in a casting-box and the stereotype was made directly from it. The present Linotype may be regarded in one sense as a reproduction of this ingenious idea of M. Herhan.

All of these methods, however, should be regarded only as studies for the stereotyping of the future. The plans which have been in use since the beginning of the century were the invention of Lord Stanhope, all other methods being superseded by it. The methods of Didot and his contemporaries could be used only by rich printers in certain difficult cases, where expense was not a great object; the plans Stanhope devised made stereotyping common over the face of the globe. In plaster stereotyping his devices were very little changed before the art was abandoned in favor of electrotyping, a period of more than three score and ten years. Lord Stanhope was very anxious to have a system by which stereotypes could easily and certainly be made, and for this purpose he engaged Alexander Tilloch, who had a number of years before made experiments in the art at Glasgow in conjunction with Foulis. Tilloch declared afterwards that he had known nothing of Ged's process, but this is not believed by Hansard. His method, however, and that which he taught Stanhope was substantially that of Ged. Stanhope, however, having sufficient means to perfect the invention, between 1800 and 1802 produced plates which answered all requirements. He paid Tilloch and Foulis eight hundred pounds, and Andrew Wilson, a printer of London, was also paid for his assistance. In January, 1804, the stereotype art was offered by Mr. Wilson, with the approbation of Lord Stanhope, to the University of Cambridge, the offer being accepted. Oxford shortly after began using it, and it slowly made its way into use on other works than Bibles, Testaments and Prayer-Books, for which it was chiefly used at the universities. When David Bruce went to Great Britain from New York in 1812 to learn the art he found only two firms which were actually stereotyping. It never has been so largely used in England as here, which may be accounted for by the greater capital and the greater conservatism of Englishmen.

In New York Cadwallader Colden, the leading scientific man of that colony, had his attention turned to stereotyping in 1743. He communicated his ideas to Dr. Franklin, who complimented him upon them. A nephew of Dr. Franklin, Benjamin Mecom, in 1775 cast plates for several pages of the New Testament. The first American stereotyper was John Watts, an Englishman, who came to the United States in 1804 or 1805. After being an employing printer in Philadelphia and New York, he began experiments in stereotyping, but without success until 1813, when he succeeded in producing a Westminster Catechism. He continued in the printing and stereotyping business until 1816, when he sold out and went to Vienna, Austria, where he set up the first stereotype foundry known there and where he instructed many eminent printers of Germany; but the real introducer of the art was David Bruce, the older of the two brothers who originated the type foundry bearing that name. He went to England in the winter of 1812, although the United States were then at war with Great Britain. He was received courteously by Lord Stanhope, who, however, declined to impart any information. Bruce engaged a workman who claimed to know the art to instruct him, but found after he had been shown what his instructor could tell and had paid his money that he knew very little. Returning early in 1813 he began his experiments, and was successful enough the next year to cast plates for a bourgeois New Testament and a nonpareil school Bible. The plates were, however, very irregular. To cast them true was impossible, owing to the warping of the molds. Turning was very imperfect, and hand-planing an interminable job. To overcome this difficulty he invented the planing or leveling machine, and stereotyping became an art useful everywhere. It was the lack of the planing-machine which compelled the withdrawal of Watts from the stereotyping business here and which limited the stereotyping of England in 1812 to Wilson in London, and Nicholl, Fisher & Dickson in Liverpool. By 1820 the number of stereotypers in New York had increased to five, and by 1830 to eight or nine. Jedediah Howe began stereotyping in Philadelphia, and the Boston Type Foundry started it in Boston. Plates were made for books and for advertisements freely in the year 1840, but even in 1855 little was done in stereotyping in small towns. There were no foundries, for instance, in Syracuse, Troy or Utica before the war, and only one in Rochester. Electrotyping began to be used commercially as early as 1850, and by 1860 most stereotype establishments had added an electrotype plant. Electrotyping gained rapidly in the next decade, while some foundries which started after 1870 did electrotyping alone, the latter costing about 5 per cent. more to do the work. Successive improvements were made so rapidly that in 1880 there were few places which did stereotyping, and now (1893) it would be difficult to have a stereotype plate made in New York. Everything is done by electrotyping. Other substances were used besides plaster, and processes were introduced which shortened the time of casting; but it was felt by all men working in this trade that to do both electrotyping and stereotyping was unnecessary. This was to have two methods of doing one kind of work and two separate plants to keep up. More room was required.

Since about 1860 stereotype plates for newspaper use have largely been used in England and the United States, and in the former for much other work. They are produced by the papier-maché process. In plaster and clay stereotyping high spaces and quadrats must be used in order to avoid the breakage of pieces of plaster. By the paper process this is not necessary. The thick and moist tissue paper used for this purpose does not descend into the hollows to any great depth; the mold will not break, and it is flexible. It was the latter quality chiefly which led to its adoption at the time of our Civil War, as by casting into concave molds convex plates could be made which would fit around the circumference of the cylinder of a type-revolving press. Several persons had introduced the use of prepared paper in England before 1855, but in that year James Dellagana, an Italian, became acquainted with the system in Paris, and went over to London to set up a foundry. He was intrusted with the experiments at the office of the Times, and invented many necessary improvements. In 1859 or thereabouts type ceased to be used on the Times and plates were used instead. In this country Charles Craske of New York was pursuing the same lines. He succeeded in making plates for the New York Herald several years before the war, but could not induce its proprietor nor any other publisher to employ his method. Experiments, however, began on the New York Tribune about 1860, and after the war broke out the plates were tried everywhere. On the London Times the columns were stereotyped singly, but the more convenient method of Craske, by which the whole page was stereotyped at once, was pursued in New York. Stereotyping is now practiced by all daily newspapers with a circulation of over ten thousand.

Plaster stereotyping depends upon the quality which plaster-of-paris has for hardening as soon as it is spread out in a thin sheet. The gypsum is previously dissolved in water and poured over the face of the type. There it sets almost immediately. It is taken off, dried and then melted metal is poured against it. When this is completed the mold is removed from the furnace and the page is taken away, the mold being broken in the operation. Afterwards the plate is planed, trimmed and examined. The first operation is the preparing of the type. It comes into the stereotype-room in an iron stereotype chase made especially for the purpose. Chases containing three duodecimo or two octavo pages are considered very convenient in size. The furniture is high, and where there are to be large vacant spaces letters or bearers are scattered over them, the replicas of which are to be cut away from the finished plate. The face of the form is first rubbed with fine olive-oil or sperm-oil, in order to prevent the permanent adhesion of the plaster. Around the form, and fitting closely to it, is fixed a metal framework of about three-quarters of an inch in depth, called a flask, and into this plaster-of-paris, in a semi-liquid state from admixture with water, is poured. While the mixture is still soft it is well rolled or spread evenly over the surface of the type, for the double purpose of giving a uniform thickness to the mold and also of expelling, as far as practicable, the minute air bubbles which, if not driven from the mold, would cause picks or small imperfections on the surface of the stereotype cast. In a few minutes the plaster hardens into a compact mass; the mold can then be lifted from the type. This mold, with others, is next placed with the face down on the floater, a plate of metal fitting on the inside of the pan. The pan, as its name implies, is a large shallow cast-iron dish or box. The lid of this pan is screwed down on the back of the molds, and by means of a crane the whole apparatus is steadily lowered into the casting-kettle containing the molten metal. The metal rapidly runs into the open corners and sides of the pan, filling up every hollow space and the minutest interstice in the plaster mold. At the end of ten minutes the pan is raised and cooled off upon the cooling-trough. The stereotyping casts, facsimiles of the type from which the mold was taken, are next secured. The stereotypes are then sent to the finishing-room for examination and approval, and the backs are twice shaved on the leveling-machines to obtain that perfect and regular thickness so absolutely essential to good presswork. They are side-planed, chiseled and thoroughly gone over for picks or other imperfections which the most careful castings will not always prevent. A plate-proof is taken and read by a proof-reader for errors which may have escaped former readings. Finally the plates are put into boxes, containing each from sixteen to ninety-six plates, according to their size, and delivered ready for the printer's use.

In stereotyping by clay the form is placed upon the movable bed of an iron molding-press, somewhat similar to that used in electrotyping. A flat iron plate is screwed upon the inside of the lid of the press, and upon this plate a thin layer of prepared clay is spread. Preliminary impressions are taken to obtain the outlines of the type and to remove the dampness from the mold. The surface of the form of type is rubbed with benzine, and the lid of the press then being closed and clamped securely by means of a lever, the movable bed of the press is raised carefully and the mold thus obtained by pressure. The press-lid is next unclamped and raised. The molding plate is unscrewed, and with the mold upon it is placed in a slow oven to dry. This takes only a few minutes, and separated by a thick wire bent into shape to fit the bottom and sides of the molding-plate the latter is clamped fast to a companion plate of equal size. Into the opening between the plates formed by the wire molten stereotype metal is poured, and the stereotype cast by the clay method is formed. This mode of stereotyping has the advantage, not possessed by the plaster, of taking a mold from low spaces and quadrats without filling them up. The clay is tenacious.

The paper process is the only one of the various methods of stereotyping which is still much practiced. The first step was the preparation of the flong or paper matrix. This is accomplished by pasting together two sheets of soft, tough matrix paper which have been previously softened by soaking in water, and four sheets of strong tissue paper. A good paste may be made of starch and flour, but the addition of a proper proportion of glue and a mineral filler gives the matrix a desirable paint-like quality of forming a skin or film on the surface of the paper instead of soaking into it, as flour paste will do. When cool the paste should be of the consistency of thick cream. A sheet of the paper is laid on a smooth stone or iron-topped table and covered with a thin layer of paste, which is well rubbed in with the brush. This process is repeated for each sheet laid on. When as many flongs, as these matrices are called, have been formed as desirable they are placed under a wet blanket to prevent evaporation. To prevent moulding they are frequently preserved in ice-chests. If the flongs are to be rolled instead of beaten a drier composition is used and a softer paper. The type which is to be stereotyped should be clean, carefully justified and surrounded by type-high bearers. For newspaper pages it is customary to employ type-high chases, with type-high footsticks and sidesticks. The form is locked up by screws. The face of the type is brushed lightly with oil to prevent the flong from adhering to it. If the form is very tightly locked up, and the chase is strong, the type will expand when on the hot table, but being able to expand only in one direction, that of length. This results in high type. To prevent this one stereotyping concern places a great primer reglet of wood inside of the sidestick and the footstick. This gives the requisite elasticity. Neither does it lock the forms very tightly. As a result, while the type expand when the heat is used they contract on cooling, and no permanently high type are made. It is a good plan to unlock the form after it is on the steam-table and let it dry for a short time before the flong is laid on. There is water between the letters, which is converted by heat into steam. For this there is no egress except through the matrix, which consequently does not dry well.

The table mentioned above is of smooth iron, of exactly the height of the tables upon which the forms are made up. The pages are slid upon it without lifting. A piece of flong a little larger than the form is laid, tissue side down, upon the page and carefully and evenly beaten into the type until the proper depth is obtained. The brushes must be good and made of extra long Russian bristles. The blows must be even and flat. The flong is then ready to be heated, which is done by sliding it upon another table heated by steam pipes. A screw press is at one end, having the lower side as a platen. Between the flong and the metal above it are several thicknesses of woolen blankets. The pressure causes the matrix to be indented sufficiently for a good cast to be taken, and the heat dries the matrix as the pressure continues. On the larger daily papers, however, the form goes directly upon a hot table, where it is partly dried, and the flong being then applied the whole is passed under a powerful roller. When it comes out it is a perfect matrix, but is not yet dry enough. It is passed upon a scorcher, an exceedingly hot table, where if left for any time it would soon be reduced to charcoal. This takes away the superfluous moisture which adheres to the surface. Prepared chalk is dusted over the surface, shaken off as well as possible, and the matrix is then ready to be cast from. It is then like a large sheet of cardboard with a soft surface.

A semi-circular concave iron mold is used. The matrix, of about the thickness of an ordinary sheet of pasteboard, is secured in this mold so that it cannot slip. Nesting into the concavity is a convex iron piece exactly matching the other. When this is secured the whole mold is tilted up and melted type metal is poured in. It fills the aperture completely and forces back the matrix against the side, causing it to assume a true curvature. When cast the end of the plate is cut off and the ends and sides are trued up; the plate is then ready to be printed from. An examination of the time occupied in making many plates shows the average for a newspaper page of seven columns, or about seventeen inches by twenty-two, to be seven and a quarter minutes divided as follows: Molding, one minute; drying, three minutes; scorching, three-quarters of a minute; and casting and finishing, two and a half minutes. The thickness of the plate at present used is seven-sixteenths of an inch, and the metal is composed of lead, eighty parts; antimony, fifteen parts; and tin, five parts. No routing is required, but hollow places are built up in the matrices.

Celluloid has been used for stereotype plates. It is very light and pretty, but is inflammable. See CELLULOID. Many stereotype plates are now made by papier maché for newspaper use. Several thousand periodicals are supplied with this matter by one establishment alone,—the American Press Association. It gives Republican, Democratic, Populist, religious, temperance, mechanical and agricultural matter, besides news and miscellany, in any desired combination. It is said to be the largest publishing establishment in the United States. Plates are sent out by it and its rivals in boxes. They are of newspaper width, and fit by tongues or grooves into the bases, which are nearly type high. The bases are kept in the printing-offices, thus saving the expense attached to solid metal blocking, or even to wooden blocking. With these a printer can supply himself with all of the matter he desires except local news. These plates enable two or three offices in the same town to be supplied from the central establishment, yet each to publish matter entirely unlike the others.

There is a process known as cold stereotyping, which is done upon paper. The flong is made with the least possible moisture, all of the water in it coming from the paste. The matrix is made by beating, and on being removed it is put into an oven to bake, trays to retain it in the curved form being employed. The oven is very hot. After the matrix is ready plates are made in the usual manner. This has not been a particularly successful method of doing the work, and is not employed in America.

Plates are packed away in boxes when an edition is worked off, and these boxes are placed in fireproof vaults. The vaults are generally of brick, strongly built and underground. The plates would thus be saved if there should be a fire. Doors to vaults are of iron. Each box should be lettered to show what work and what pages are contained in it, and the vault man should also keep a book showing what plates he has in his charge. It is reasonable to demand rent for plates thus left in custody upon which no printing has been done for a year.

Stet (Lat.).—A word written on the margin of a proof when a proof-reader has inadvertently marked out a letter, word or sentence which on second thought he prefers to leave unchanged. It is derived from the neuter verb sto, meaning to stand, to endure, or abide, and signifies "let it stand." Most readers also place dots beneath the word which is to remain.

Stick.—1. A composing-stick. 2. When letter which is laid up for distribution adheres so closely that it is separated with difficulty and the compositor's fingers are made sore by pressing the type against the edge of the case in order to distribute them, it is said to stick. All new letter is difficult to separate and distribute if it remains long in the chase after being worked off, because the lye penetrates the interstices of the letters. New type, says Ringwalt, should always be saturated with a solution of soft-soap and water before being laid into case. This not only prevents sticking, but takes off the extreme brightness which is so unpleasant to the eye, and renders the type more agreeable to the hand. Old type will stick the harder if the ink is not properly washed off and the form is not well rinsed before the types are put away.

Stickful.—The quantity of type contained in a stick, or about two inches. Some sticks contain slightly more and some a little less. In Italy, France and Spain a stick will contain only three or four lines, and sometimes only one or two.

Stigmeology.—The art of punctuation, from a word signifying a spot. This word is used in diplomatics, but is not employed by printers.

Stiffener.—A thin mill-board used for various purposes in bookbinding.

Stippling.—A method of engraving by which, instead of lines, dots or punctures are used. The variations and progressive magnitude of these dots give the whole effect to stippled engraving. When these punctures are made by the dry-point they are circular, but when made with the graver they are rhomboidal or triangular. Stippling is not regarded with as much favor by artists as engraving in line, but it is considered to have some advantages in the softness and delicacy of its lights and shades, and approaches nearer to the effect of painting. A more expeditious way of multiplying these dots has been contrived in the instrument called a roulette, a toothed wheel fixed to a handle, and which when rolled forcibly along the metal produces a row of indentations. This method, however, is less manageable than the other, and generally produces a stiff effect.

Stitching.—The operation of passing the thread through a pamphlet for the purpose of securing the sheets together.

Stock-Room.—The department allotted to the storing of paper or printed stock.

Stockholm.—The capital of Sweden. Much printing is done there. The art was introduced in Stockholm in 1483 by Johannes Snell. Panzer enumerates five books printed in this city during the fifteenth century. In the year 1594 Amundus Olai was appointed typographer royal. At Stockholm the first Runic types were used in a Runic and Swedish Alphabetarium in the year 1611. They were cast at the expense of the king. A new and more correct font was cast at Lübeck in 1702 by desire of the learned Peringskiolb. Russian types were first used in Sweden, at Stockholm, by order of Gustavus Adolphus. Many printing-offices are now found in that city. Among the largest of these is that of P. A. Norstedt & Söner. It employs two hundred and fifty persons. Another large establishment is that of Albert Bonnier.

Stone.—An imposing-table, either of iron or stone.

Stone Type.—Two Austrians, F. Kammann and F. Jurschina, claim to have succeeded in making artificial stone letters. The material is kneaded and partly dried and then pressed into the molds. When sufficiently dried it is ready for use. The basis is silicic acid and hydraulic lime.

Stop-Cylinder.—That class of cylinder printing-machines in which the drum stops after the impression is taken and does not resume rotation until it is necessary to take another impression.

Stops.—Punctuation marks or points. The term is now little used.

Storekeeper.—The person responsible for the care of type and other materials in a printing-office.

Store-Room.—The department for storing type, leads, furniture, &c.

Stower, Caleb, the writer of several books upon printing, was an employing printer at Hackney, London. He died on May 23, 1816. He was the author of Typographical Marks Explained, 1805; Guide to the Art of Printing, 1808; Printers' Grammar, 1808; Printers' Price-List, 1814. They are meritorious productions.

Straight Accents.—Another term for long accents, thus: ā ē ī ō ū.

Straight-Edge.—A long wooden or metal stick used for squaring up the pages in a form in order to obtain correct register in printing.

Strahan, William, king's printer in the last century, and the warm friend of Franklin, who corresponded with him for many years, was born in Edinburgh in April, 1715. He was apprenticed to a printer, and after becoming free moved to London, where after a time he began business for himself. He had been employed in the same office as Franklin. He displayed extraordinary economy, and was soon prosperous. When Charles Eyre, in 1769, succeeded to the patent of king's printer he appointed Mr. Strahan as his printer, the latter purchasing a portion of the patent in 1770. He was an active man in politics, and in 1775 he was elected to Parliament as member for Malmesbury. In the Parliament of 1780 he was member for Wootton-Bassett. He remained in Parliament until the dissolution in 1784, and died shortly after, on July 9, 1785. He was succeeded by his son Andrew. It was to Mr. Strahan that Franklin sent his celebrated letter setting forth in a few pithy sentences the wrongs which America had suffered from the king, and ending: "You are now my enemy, and I am yours, B. Franklin." This letter will not bear the construction which has been put upon it by nearly all writers. The true sense is: "You are now my enemy, by the action of the king, and I must so regard you until the war ends, although without personal feeling."

Strasbourg or **Strassburg.**—One of the earliest towns into which printing was introduced. Mentel and Eggestein were the first two printers. One authority supposes that Mentel began printing in 1458; but the first dated book from Strasbourg was by Henry Eggestein in 1471.

Strawberry Hill.—This famous press was established by Horace Walpole at his house in the country. He was the second son of Walpole, the prime minister of George II., the length of whose tenure of office was unexampled. The son was brought up with an excellent education and highly cultivated tastes, but was disposed to take no active part in the struggles of life. He was a connoisseur in painting, architecture, music, the drama and sculpture. In 1757 he determined upon putting in a press, upon which several noted works were printed. Dr. Dibdin gives an account of them. His first printer was a "foolish Irishman, who took himself for a genius." His name was William Robinson. This man was succeeded by Thomas Farmer; Pratt followed him, and last was Thomas Kirkgate, who went there about 1765, and remained until the work in this office was suspended, in 1797, upon the death of Walpole.

Straw-Board.—Paper boards of various weights, used for binding purposes and made from straw-pulp.

Streamers.—Large posters intended to be placed side by side instead of above and beneath each other. They usually consist of one word or series of words, as Dan Rice's Great Show.

Stretchers.—Bills or placards printed in colors, or in ornamental style, mounted on frames of wood.

Strike.—1. An abandonment of work by workmen or workwomen to enforce compliance with their requirements respecting wages or matters appertaining to their comfort. The corresponding term, when employers close their places to enforce a similar demand, is "lockout." The earliest American strike in the printing trade in the United States was in New York during the Revolutionary War, when the workmen in Rivington's office ceased labor. A strike somewhat similar to those now carried on took place in the printers' trade in New York in 1810. Printers' strikes are always short, one side or the other giving way within three weeks. The only exception known to this was the late strike in Pittsburgh, in which the workmen had the support of the entire country. It lasted a year and a half. Both strikes and lockouts are to be condemned as methods of settling trade differences. 2. A matrix formed from the original punch.

Striker.—1. The arrangement by which the pens on a ruling-machine are raised or lowered to interrupt the continuity of the line. 2. One who strikes to enforce a demand concerning wages or trade government.

Strip a Form.—To take away the furniture from the pages of a form, and thus leave it naked. This is an English expression.

Stroker.—In England, a small implement, generally made of wood and tipped with metal, for stroking in or laying on sheets in a printing-machine.

Stroker-In.—In England, the layer-on who strokes in the sheets one by one to be printed. In America it would be said to be the boy who feeds a press.

Strokes.—The up and down lines of any letter.

Studley, Robert P., a printer of St. Louis, who began business there in 1854. Through outside speculations of a partner he failed in 1875, but by the aid of his brother and friends he began again, and finally paid up all his indebtedness. He was the oldest employing printer in St. Louis, and was highly esteemed. His death occurred on November 9, 1890.

Stuttgart.—A German town where printing was introduced in 1486, although the name of the printer is unknown. It is now a very large printing centre, its work going round the whole world.

Style of the House.—Most printing-offices have their own particular method in the matter of display, spelling, &c., and this is known as the style of the house. In some establishments, for instance, the names of ships are in Italics; in others not. One place may spell honor with the u, divide words on the vowels, or put a comma before "and" when there are three or four clauses coming together, this word being used before the last. Other places do not follow these rules. In each case the methods followed are the style of the house.

Stylus.—A pointed instrument of brass or iron used by the ancients for writing upon waxen tablets, the reverse end being left blunt in order to make erasures by smoothing the surface of the wax. It is now used for writing upon manifold paper.

Sub-Editor.—In England the assistant to the editor-in-chief. He is most generally the head of the news department, and has no authority over the editorial matter. A corresponding title here is managing editor or assistant editor. The responsibility in this country, however, is greater. The managing editor employs and discharges the force of editors and reporters, and is in charge of everything when the editor-in-chief is absent.

Sub-Heads.—Words or expressions placed above or at the beginning of chapters, sections or paragraphs to indicate their contents.

Subscription-Books.—Books sold from house to house by canvassers. A larger number can thus be disposed of. The firms which engage in this business usually devote their entire energies to this line.

Subscriptions to Newspapers.—The most surprising statements have been given currency with regard to the law of newspaper subscriptions. As a consequence almost everybody seems to be misinformed on the subject. If these misrepresentations were originally designed to force subscriptions they have undoubtedly in a large measure accomplished their purpose; but, on the other hand, many a publisher has found himself a heavy loser from having relied upon them. Perhaps one of the worst articles, often published, is this: "(1) Subscribers who do not give express notice to the contrary are considered as wishing to renew their subscription. (2) If subscribers order the discontinuance of their periodicals the publisher may continue to send them until all arrearages are paid. (3) If subscribers neglect or refuse to take their periodicals from the post-office to which they are directed they are responsible until they have settled their bills and ordered them discontinued. (4) If subscribers move to other places without informing the publisher, and the papers are sent to the former address, they are held responsible. (5) The courts have decided that refusing to take periodicals from the office, or removing and leaving them uncalled for, is prima facie evidence of intentional fraud. (6) If subscribers pay in advance they are bound to give notice at the end of the time if they do not wish to continue taking it; otherwise the publisher is authorized to send it, and the subscriber will be responsible until an express notice, with payment of all arrearages, is sent to the publisher." These declarations are sometimes even called "decisions of the United States courts." Indeed, it has also been said that the "latest postal laws are such that newspaper publishers can arrest any one for fraud who takes a paper and refuses to pay for it. Under this law the man who allows his subscription to run along for some time unpaid and then orders it discontinued, or orders the postmaster to mark it 'refused,' and have a postal-card sent notifying the publisher, leaves himself liable to arrest and fine the same as for theft." What are the facts? There is no United States statute touching the subject other than the one which simply provides that "postmasters shall notify the publisher of any newspaper or other periodical when any subscriber shall refuse to take the same from the office or neglect to call for it for the period of one month." Of State statutes there are but three. Florida has had one since 1851 providing that "no person shall be liable to pay for any newspaper, periodical or other like matter, unless he shall subscribe for or order the same in writing." The Legislature of Oregon passed a law in 1889, as did that of Washington in 1890, providing that "whenever any person, company or corporation owning or controlling any newspaper or periodical of any kind, or whenever any editor or proprietor of any such newspaper or periodical shall mail or send any such newspaper or periodical to any person or persons in this State without first receiving an order for said newspaper or periodical from such person or persons to whom said newspaper or periodical is mailed or sent, it shall be deemed to be a gift, and no debt or obligation shall accrue against such person or persons, whether said newspaper or periodical is received by the person or persons to whom it is sent or not." All that the Post-Office Department has to say is embodied in section 261 of the 1887 Postal Guide, still in force, which states that the "liability of persons who take newspapers, periodicals, magazines, &c., coming to their address out of a post-office for the amount of subscription thereto is not determined by any postal law or regulation. It is entirely a question between publishers and subscribers, with whom postmasters have nothing to do, they being required to deliver properly prepaid matter to the persons named in the address." Authoritative decisions on the subject are also very few. The United States courts have rendered none. The Supreme Court of Wisconsin held a few years ago, in the case of Goodland versus Le Clair, that testimony which tended to prove that a newspaper was mailed, addressed to the theatre owned by a certain person and received there for one year and was never refused or returned, was sufficient to support an action against such person for the subscription price. This case stands alone. It would as much sanction charging for papers sent to advertisers as anything else, because the paper here was one sent to an advertiser. In the New York case of Hathaway versus Bennett it was decided in 1854 that a person who had bought out a Herald carrier and had been supplied with papers for two years could not, in the absence of any more particular contract, compel the publisher to furnish him papers longer than he chose to, any more than the publisher could compel him to continue to take same. The court said there could be no contract in such a case without mutuality. If there had been any contract, for the publisher to have stopped the publication of his newspaper would have constituted equally a breach of contract with that alleged. The Supreme Court of Minnesota holds that under a statute forbidding the doing of any labor, business or work on Sunday not of necessity or charity, the circulating of a newspaper on that day is unlawful, and any contract requiring or contemplating it is absolutely void, and this even though the contract merely covers a period of time including Sundays. Newspaper subscriptions must, therefore, be governed, as intimated by the American and English Encyclopædia of Law, by such general rules in regard to contracts as are applicable. The continuation of a subscription will be implied when the continuation of any other similar contract would be. When a contract is terminated there is no obligation resting on either party to say that he does not wish it renewed. Renewals in any case would undoubtedly have to be for some certain period. If a renewal for any term were ordered or could be implied, but should not be paid for, failure to pay would not of itself authorize another renewal. No one can impose a new contract on another simply because that other refuses to fulfill the old. Neither would an original subscription or renewal be extended by a subscriber's removal, without notice. Nor can fraud be found unless there is intentional deception. And mere refusal to take a periodical from the post-office, or removing and leaving it uncalled for, cannot be presumptive of fraud. Whether receiving a paper will imply an agreement to pay for it depends on circumstances—what the receiver may understand about it, its use by him, and the like.

Substitute.—One who works at case instead of another. The word is of general use in America to indicate a printer who takes for a short time the place of a compositor regularly employed. His powers are derived from the regular, and in meetings of a chapel he votes as the other might, while if not actually working he cannot vote. In a daily morning paper one is required for every four or five hands; but on evening and weekly papers one will supply many more. It is not a recognized custom in book and job offices, although one is sometimes seen. In England a substitute is called a grass hand.

Suction.—As applied to rollers this word means the tenacity with which they adhere to the type or other substance on which they are placed; strong suction is equivalent to great tenacity. The French have a very expressive word for this quality, "amour," or love. A good roller has "amour parfait."

Suertes (Sp.).—Sorts.

Sumario (Sp.).—Summary, table of contents.

Summer.—A piece of wood fastened across the ribs of a wooden press close to the winter, to keep them steady in their place.

Sun Machine.—A small platen jobbing machine, for treadle or steam, made by Greenwood & Batley in England.

Super-Calendered Paper.—Paper highly polished by repeated pressure between steel rollers.

Super-Extra.—In bookbinding this has reference, like extra, to the binding of a book which must be forwarded in the best manner with colored end leaves, double head-bands and broad registers.

Super-Royal.—A size of printing-paper, measuring in England 27½ by 20½ inches; writing, 27 by 19 inches. In America super-royal is employed only for printing papers, and in these it measures 22 by 28 inches.

Superior Letters or **Figures.**—Small figures or letters at the top of a line, as ^{12}, intended usually for references. They may be cast upon the same body as the larger letters, or they may be justified in.

Superiors.—A short term embracing both superior letters and superior figures.

Supernumerary.—An extra hand on a London daily who was not so regularly employed as the others.

Suplente (Sp.).—Substitute.

Suplir (Sp.).—To substitute one workman for another.

Supplement.—An addition to a book or newspaper. In the former it is usually matter which has been omitted by mistake or on account of the difficulty of obtaining it, together with such new matter as the lapse of time has rendered necessary. For instance, a dictionary or encyclopædia requires a supplement to give new meanings, words or information. In a newspaper a supplement consists of the pages printed beyond the regular number. If it is an eight-page paper, all printed beyond that is properly the supplement; but by the usage of many dailies the supplement is the part printed before the news sheets, and contains four pages or more with a separate head.

Surface.—A short term for an imposing surface or stone.

Surface Cards.—Cardboards not colored right through, but merely the top and bottom sheets, sometimes one side only—distinct from pulp-boards.

Surfaced Paper.—Paper with any prepared surface, colored or otherwise. Surfaced paper is now largely employed on magazines and on illustrated work. It is much smoother than other paper, and gives the best effect on half-tone work. When colored it may be dull or glazed.

Surtido (Sp.).—Assortment, stock, supply. Obra de surtido, book in which, for the sake of economy, the matter is crowded into as small a space as possible.

Swash Letters.—Seventeenth century Italic capitals, with tails and flourishes.

Sweden.—In Sweden there are 195 printing establishments, with 2,000 compositors and pressmen. Two hundred and ten compositors were women and 13 women at press. There were 296 printing-machines, 121 treadle-presses and 183 hand-presses. In 1800 there were only 35 offices in the whole kingdom, Stockholm having 13 of these.

Sweepings.—Applied to the paper rubbish swept up, and sometimes to the pi picked up from the floor.

Sweinheym and **Pannartz.**—The earliest printers of Italy were Conrad Sweinheym and Arnold Pannartz, who began their work at the monastery of Subiaco, a town near Rome. They were Germans, and it is very likely they had learned their calling in Mentz, which was sacked in 1462. In 1465 they produced a Lactantius. It was a large folio volume, in Roman type, but disfigured with German mannerisms. They removed to Rome in 1467, where they printed and published so many books in a few years that they were involved in great pecuniary difficulty. In the year 1472 they petitioned the Pope for relief, setting forth that they had printed 11,475 copies of twenty-eight works, a very large portion of which had not been sold, and that they were in great distress. In 1473 Sweinheym withdrew from the partnership, and was thenceforth an engraver. Pannartz died in 1476, and Sweinheym in 1478.

Swell Rules.—A species of ornamental rules, thus known in England.

Swifts.—Good and fast compositors were sometimes thus denominated in England. The expression has not been used in America.

Switzerland.—Printing was introduced into this country at Basle in 1468, the first printer being Berthold Rot of Hanau. Switzerland has long displayed much literary activity, and printing has developed very largely. Geneva, Basle, Berne and other towns do much work. Three languages are used in this country, German more largely than French and Italian. From the fact that Switzerland is chiefly a Protestant country, but surrounded by Catholic ones, and a republic, although hemmed in by monarchies, it has been a favorite place of resort and publishing by authors whose opinions did not coincide with those of the majority of people they left behind them. Five years ago Switzerland had 776 journals and periodical reviews. The canton of Zurich comes first with 123 journals, although Basle and Geneva have a larger population. Of these journals 491 are published in German, 229 in French, 17 in Italian and 10 in English, Polish and Russian; 26 of the publications are each printed in two, three and even four languages. In 1883 there were in Switzerland 294 letter-press printing-offices, with 2,441 hands, foremen included; in 1886 the number of offices had grown to 347, with 2,791 operatives. There were 25 offices in Basle, the town having about 65,000 inhabitants.

Sycamore-Wood.—Wood sometimes used in England for large, coarse cuts, as the material is too soft to allow of fine lines being engraved from it. Pear-wood is also used as a substitute for boxwood.

Syllable.—A single elementary sound, or a combination of sounds, uttered at one impulse of the voice.

Symbols.—Signs or marks peculiar to any particular science or art.

Syndicate.—A combination of business men, firms or corporations having the same objects. Among newspaper men it should be a combination of writers, but it is in effect when a literary agent buys copy which he sells again to newspapers. He disposes of this to the latter at low rates, but by having several customers he practically gets a much higher price than any one of them would give singly, and is thus enabled to remunererate the writer. The journal thereby has much more good copy than before, while paying less money for it.

Synonyms.—Words having the same significations. Nearly all words thus classified will be found, however, to vary from each other in some respect. A knowledge of these is essential to a compositor, and particularly to a proof-reader, as they will enable him frequently to tell an author's meaning when the characters cannot be puzzled out. Each of the dictionaries contains under the principal words a list of its synonyms, but Roget's Thesaurus will be found particularly valuable for elucidating bad copy.

Syriac.—This language was first printed from metal type in 1555, at Vienna. Type for it is not cast in this country, but is imported from Great Britain or Germany. The alphabet consists of twenty-two letters, which generally have four distinct forms. There are points, dashes and vowel marks.

T

T THE twentieth letter of the English alphabet, is the consonant most used, and occurs in order of frequency more than any other letter except e. One lower-case letter out of eleven is a t. In thickness it is about the third of an em. It agrees with the capital in having a crossbar, but is otherwise much different. It is the only small letter which is taller than an n or an o, and yet is shorter than the l or d. T is used as an abbreviation on all ancient monuments, &c., for Titus, Tullius and other names. As a numeral it signified 150. With a dash over it it signified 150,000. When the Roman tribunes approved of senatorial decrees they subscribed a T. In music T signifies tenor, also tace, to indicate silence; and it is likewise the sign of tutti, a direction to the whole band to play after a solo. It also stands for trillo, a shake. The T is used to denote things of this form, as a T bandage in surgery, one consisting of two bands which cross each other; the T palace in Mantua, or the T rail.

Tabelaria, Imprenta (Sp.).—The art of printing from engraved wooden plates, practiced before the invention of movable types.

Tabelle (Ital.).—Tables or tabular matter.

Tabellen (Ger.).—Tables.

Tabla (Sp.).—Board for forms or paper.

Table.—1. The arrangement of figures or figures and words in parallel columns of regular proportions, so as to present a general view of the subject to the eye, as is done in mathematical and astronomical work, statistical publications, &c. 2. A name given to the part of the hand-press which runs in and out from under the platen and carries the form; thus used in the Stanhope press, in which a plain flat iron table superseded the coffin, plank and stone. It is known in America as the bed.

Table des Matières (Fr.).—Table of contents.

Table of Contents.—The summary at the beginning of a book which shows what the work contains. It is divided into paragraphs, hanging or otherwise, by the chapters or books, and the number of the page on which a subject begins is usually put after the words which relate to it. A table of contents is very different from an index, which is alphabetical, while the table of contents follows the order of the book. The latter is usually set about two sizes smaller than the body of the work. It begins on an odd page.

Tablero (Sp.).—Feed or delivery board of a press; binder's press-board.

Tabular Work.—Composition of tables by a printer. It is divided into two classes, figure, and rule and figure work. The latter is slower and more expensive, but at the same time is regarded as the neatest. Most tables, in addition to the body, have heads, showing to what the columns relate, and footings, which sum them up. The body may be entirely in figures, but usually the first column is of words and the others of figures. Sometimes, however, these are wholly or partly of words, as in the following:

AMOUNT OF PRINTING DONE IN NEW ENGLAND IN 1869.

STATES.	CAPITAL.	Amount of Printing.
Maine	Augusta	$294,959
New Hampshire	Concord	244,879
Vermont	Montpelier . . .	99,701
Massachusetts	Boston	2,905,916
Rhode Island	Providence . . .	205,262
Connecticut	Hartford	641,500

This table would still be entitled to the designation were the last column words instead of figures, or if the rules and headings were omitted. Generally the type used for a table is smaller than that employed in the body of a book, and its headings are yet smaller. When a detached table occurs in a book without other tables it is usually made a little less than the total width of a page, if this can be done and still leave enough room. If, however, the table is at all cramped it had better be the entire width of the page. In each column the widest place should be taken as establishing the width of that column. If this is the footing it determines the size. The heading, however, may be wider than the column below it, and in that case its width governs. An example is shown below, being the prices of book composition in New York in 1872, and the highest rates ever given in that city.

In this table the word "solid" is as wide as any of the figures, and the word "leaded" is wider than any. Consequently the width of the columns is determined by these two words. If this table were to be set up in nonpareil in a measure of about forty ems of that type the width of the upright column rules would be deducted, then the width of the first column containing words, and afterwards the last four columns would have the remaining space divided between them. Supposing the rules to be two ems of nonpareil and the reading matter

RATES OF COMPOSITION IN NEW YORK.

LANGUAGE.	MANUSCRIPT.		REPRINT.	
	Solid.	Leaded.	Solid.	Leaded.
Works in English	$0.53	$0.50	$0.50	$0.47
Latin, Spanish and German	.62	.58	.57	.53
French, Italian and Portuguese	.64	.60	.59	.55
Welsh, Indian and African	.67	.63	.62	.58
Greek, plain	1.00	.96	.75	.65
Hebrew, kerned, vowel points and accents .	2.00	1.95	1.95	1.90

eighteen, this would leave twenty ems to be divided among them, or five to each. If this table were to be squeezed into one column of this book the words "solid" and "leaded" would be turned around, so as to read up the page, and the reading matter would be lessened in width as well as the four columns. Should this be across the page the reading matter would take up thirty ems or more, and the remainder would be distributed between the four columns. In the table on page 141 the table is spaced out, as it would not go into a column. Part of it is repeated to show how it would look in a single column:

DIMENSIONS OF PAPER.

NAMES.	De Vinne.	Magarge.	Philadelphia.	English.
Billet Note (writing) . . .	6 × 8	......	6 × 8	......
Flat Cap (writing)	14 × 17	14 × 17	14 × 17	......
Imperial (writing)	22 × 30	23 × 31	22 × 30	22 × 30
Double Crown (printing) .	......	......	......	20 × 30
Double Elephant (writing) .	26 × 40	......	......	27 × 40

If the headings are disproportionately large they are turned sidewise or are abbreviated, if the words and the work will allow of it. Neither words nor figures should be against a rule, if possible, but they should be set off from it at least an en quadrat. If an ordinary condensed table this is enough; but if there is much space to spare and there is no other table with which uniformity must be kept, an em or more should be allowed; that is, between the last figure in each column and the perpendicular rule. Every column is set and guided by the last figure or the column of units. The only exceptions are when fractions or reference marks are used, or when decimals are denoted in the same way that some bookkeepers show cents in a column chiefly of dollars. In each of these the units determine the whole column:

TABLE SHOWING HOW IRREGULAR COLUMNS ARE TREATED.

1	*2*	*3*	*4*	*5*
9	341	$342	112	11
123	342	312	391	207
7	343+	1,407	82¼	311
94	344	99.43	117	94
1,194	345—	240	204	107
6	346	116	309½	64*
7,022	347	11	118	123
244	347*b*	144	77	256

The position of the fractions, decimal, minus and plus marks or references is regarded as no part of the column of figures, and consequently the last whole figure of each number is the guiding line. No table can be set by the eye. It must be measured by quadrats and spaces. If a column contains a figure like 3.14159, the ratio of the circumference to the diameter, there are six figures, each the width of an en quadrat, and a period, probably about the quarter of an em. The space needed would be three ems and a quarter. To this must be added the space necessary to set off the last figure from the rule, probably an en quadrat. It must not be in this place four four-em spaces, because that makes up the column to even ems. All justification should be done before the figures and not after them. Headings over words are usually in small capitals capitalized, but often in small capitals alone. Those over figures are in lower case usually, but in many well printed books, where the time can be afforded, they are in small capitals, either capitalized or not. Figures over figures are frequently in Italic, and all of the headings are sometimes so set. In tables for folio and quarto books capitals are sometimes substituted for small capitals, and in commercial work, such as reports of conventions, it is not uncommon to see the principal headings and sub-headings in display type. In bookwork they should be in the same sized type in Roman or two sizes smaller, the latter being preferable. All rules between the columns of figures or figures and words are of thin brass, the shoulder being given to them by em or en quadrats. The rules below the final headings are type metal two and three em dashes, with em and en dashes added when necessary to justify. If the table is open a line of quadrats may be placed below this dash line and another over it. Where the brass rule ends, if there is another rule there running transversely, it must touch it. The faces of the rule should appear as if they were joined, or at least as close to this result as possible. When rules go completely around a table it is said to be boxed. The corners should be accurately mitred if the rule cannot be bent at right angles.

The first thing necessary in setting a table is to lay it out. If it will easily go into a page set the stick to that measure. Find how many perpendicular rules will be required, and put that number of short pieces in the stick. Then set up quadrats enough to fill out the measure. Suppose that the type is brevier, thirty-six ems wide, and that there are six rules, which will take two and a half out of this measure. This gives thirty-three and a half ems to be divided between seven columns. Probably there will hardly be room enough for much space with the words. The columns of figures should consequently be gone over and the amount estimated for each. Upon a piece of paper put these down, giving all which remains to the first column. This will look as follows when transferred on the sheet of copy, as will probably be done:

17½	2½	4	3	2	2½	2

Footings need to be looked at carefully, and allowance made both on the table proper and the footings for periods, commas and dollar marks, as well as any other marks. The headings should then be considered. Some of these are very small, and others have many words. By turning the headings sidewise the long headings can generally be embraced in two or three lines, while small headings can be set in the ordinary way. Should there be any doubt about any of them that part should be set and carefully examined to see that there is no error. Then if the headings do not match with the figures below the latter must be enlarged. Thus, suppose that the headings cannot be brought into the dimensions sufficient for the lower part of the table, the two will look thus:

13½	2½	4	3	4	2½	4
17½	2½	4	3	2	2½	2

The lower part must then be adjusted to suit the upper. It will sometimes happen that the body cannot be spaced out to suit the heading without serious injury to its appearance. In this case the heading should be examined to see whether the proposed space cannot be reduced. When headings follow each other, turned sidewise, each must begin with the first letter of the first word nearest to the body of the table and go up; the matter which overruns is a hanging indentation, and its beginning is next to the second column of figures. The example here given is copied from work executed at the Congressional Printing-Office, and is in exactly the form in which statistics are printed in Washington, in Albany and in the government printing-offices of Great Britain.

No other method is permissible in good printing-offices. It has the advantage that the first line of the head comes against the first line of the figures, and the last line against the last line of the figures. We begin in reading at the left and read towards the right. Were the head turned around, as is sometimes seen, the first line of the heading would be against the units and the last line of the heading against the thousands or millions. A second reason is that a table is frequently split. If the headings are as in the traditional way one heading follows another, and they can all be read in order, just as in a column of reading matter. One page also properly follows another.

STATISTICS OF HIGHER INSTRUCTION.

States.	Number of Schools.	No. of Instructors.			Students.				Number of Volumes in Libraries.	Value of Scientific Apparatus.	Value of Grounds and Buildings.	Amount of Productive Funds.
		Male.	Female.	Total.	Number in Preparatory Department.	Number in Collegiate Department.	Total Number.	Number of Graduates in 1889.				
Maine	2	15	11	26	30	70	493	61	9,100	$8,500	$205,000	$146,000
New Hampshire	3	7	19	26	96	315	441	32	2,400	2,305	225,000	32,000
Massachusetts	9	103	181	284	29	1,756	2,099	231	75,437	46,000	3,094,000	1,062,925
New York	13	40	243	283	808	1,121	2,806	149	46,165	133,997	2,330,128	698,127
New Jersey	2	3	18	21	21	35	144	19	300	1,550	120,500	....
Pennsylvania	12	56	128	184	275	866	1,334	142	31,180	15,000	960,000	713,000

No period or other point is required in a table to give the table itself punctuation. Nothing at all would have been said about this if it had not been that one of the English reviews places a period after the last figure in a column before a footing, and also after the footing. This would require a series of four or five em spaces to be placed down the side of the table. Each column should have about as much space at its side as each of the other columns. If the table is leaded special leads must be cut for each width. Most tables are set in sticks having only one column. That is completed and emptied, and then the stick is reset for the next column, and so on until all is done. This may be necessary in headings, but it is frequently easy to set the whole table across the page or column in one stick, the thickness of the rules having previously been deducted. Take, for instance, the tables on page 186 and page 309—the latter being divided. Begin and set directly across. When the figures are set and the matter is deposited on a galley, that is wet and a rule of the right length is introduced between the last column and the next to the last column. The type is not very wet, and the division is made with a steel rule or a penknife. Then the next rule is inserted, and so on until all are in. If the proper quadrats and spaces have been inserted the table will be ready for locking up at once, and will lift. Should there be any doubt about this, as for instance when the matter has been set by an apprentice, it can easily be tested. Divide it in two perpendicularly before the top and bottom rules have been added, and lift the matter as a handful of type would be lifted for distribution, but with the fingers to the sides instead of the top and bottom. This will show if there is any hard or loose justification. This method of inserting rules can be adopted even when the matter is dry; but in this case the galley should be level, and there should be something against each side to prevent the letters from falling down. Such a plan cannot be tried with tables like that on page 304. Tabular work which has no rules should be set across the column or page, instead of being set down the column. If there are columns of words the measure must be broken, and the matter is set in sections, as below.

1 No.	2 Name.	3 Age.	4 Rank.	5 Value of Real Estate.	6 Value Personal Property.	7 Birthplace.	8 No. of Children.
1	Henry Wilson.	53	Captain.	$4,000	$250	Virginia.	2
2	John C. Hopkins.	24	Lieut.	2,100	250	New York.	..
8	R. Wilson.	27	Captain.	1,800	250	New York.	2
4	George Oliphant.	87	Major.	13,400	750	Virginia.	3
5	Edw. Ross.	28	Lieut.	......	250	Kentucky.	..
6	Thomas Todd.	72	Colonel.	9,000	500	New Jersey.	6
7	A. B. Rose.	34	Lieut.	7,000	500	Maine.	4
8	James Thorpe,	59	Captain.	1,200	250	New York.	7
9	Theo. Gates.	27	Lieut.	400	250	Virginia.	1
10	William G. Beals.	61	Captain.	2,700	500	Maryland.	2

In this table the first, second and third columns can be set together, the justification being done after the second one; columns 4, 5 and 6 would take another stick, and 7 and 8 a third. It would also be possible to have the last stick have columns 5, 6, 7 and 8, but that would still necessitate two measures before. Some experienced compositors might put these first four columns into one stick, as the regularity of spacing in the fourth column could be determined by the repetition of the word captain; but this would be very unwise for the majority of men to attempt.

Various contrivances have been made to lessen labor in composing tables. There are several manufacturers of sticks with three or four slides. Each division is set for a column, and the compositor is saved from the mental hesitation he often has when he is setting the matter in single sticks. In some places commas and periods are cast upon en bodies, and dollar and pound marks upon em bodies. It is well in good bookwork to have each rule of one piece of metal and not to join two or three to make a single line. Labor-saving rule is not desirable for tables in which a fine appearance is necessary, as the joinings become painfully apparent when the rule has been subjected to any wear. In newspapers, on the contrary, there should be a join to tables every two or three inches, so that they may be divided easily and the matter lifted by handfuls. In bookwork the rules should be cut from full length strips, each to pica ems and ens, unless it is an office where very much rule work is done with a standard of another size, as small pica or bourgeois. No piece once cut should be cut down again. Should such a practice be allowed cutting would go on continually, and the office would never have enough of the longer sizes. Of course, if a rule becomes battered the end should be cut off, if it is near the end, or it should be divided and the battered part cut out. Rule should be carefully assorted as to length and put away in cases. If a table is to be set in minion and the rules are pica, space can be added at the sides or at the bottom or top to make the whole match. In this case the difference may be very little, requiring nothing more than a sheet of paper. Rules must be rather shorter than the matter to allow for locking up. If the rules reach as far as the type when the matter is loose on the galley they will certainly bind when the page is locked up. Type-founders do not always cast type with perfect regularity, and consequently it may happen in a large table that a perpendicular line of figures of one kind is a little larger or smaller than that alongside of it. For instance it may happen that if the figures 127 are repeated one hundred times, each falling below the other, the 2 at the bottom of the column will be a little higher in line than the 1 or the 7. In this case the characters should be looked at individually to see whether there are any wrong fonts or whether there is any dirt or burr on the type. Should they appear to be right the short line must be lengthened by little pieces of paper inserted at intervals, so as to be imperceptible. Quadrats should be used in large tables for blank spaces, but it is well here and there to have a lead or a slug to stiffen the matter, if it is convenient.

Tabular matter, according to the general usage of American offices, is charged for at a price and a half when in three or four columns without rules; but five columns without rules or three with them is double price. The employer estimates in the same way, charging one-half more or double what he would charge on plain work. Part of a page, otherwise blank, is charged for as a whole page. An extra price must nearly always be charged on presswork, as the rules cut the paper and tympan, and the form requires much overlaying and underlaying. If the page is electrotyped the rules should be tried for height to paper, and if higher than the types the latter should be underlaid, so that the shell may be perfectly even and true upon its face. This saves much expense at press.

Taca or **Alza** (Sp.).—Underlay.

Tacca (Ital.).—The nick or nicks.

Tachar (Sp.).—To blot manuscript or printed sheets.

Tacky.—With rollers or with glue, adhesive. A roller is said to be tacky when it clings to the distributing-table or the type.

Tacón (Sp.).—Feed-gauge.

Tags.—Pieces of stout paper, cardboard, paper combined with linen, &c., cut into convenient shapes and sizes and eyeleted, so that they can be readily attached by a string to bundles, packages, &c., to serve as direction-labels. A very large number of tags are now used, many of them containing printed matter setting forth the business and address of the person by whom they are issued.

Tail.—The bottom space below the pages.

Tail-Pieces.—Ornaments used at the ends of chapters and sections of books. They are sometimes fine engravings of themselves. Head pieces are generally like a band at the top of a page, extending completely across, and being three, four or more times as wide as they are deep. Tail-pieces are generally much shorter and squarer, as they have more room. Both head and tail pieces are separated from the wording by considerable intervals, certainly not less than two pica lines, and generally much more. An office should have a stock of these ornaments for itself, which have not been bought from the type-founder, but have been designed for it.

Take.—That part of copy which is given out at once. It may vary from a few lines to a week's work. In a daily newspaper the takes are very short, usually from ten to thirty lines, and sometimes down to four or five. They are numbered either consecutively from the beginning of work from 1 up to 3,000 or 4,000, or by classification, in which case a take in advertisements may be 1ad, one in editorial 14ed, one in financial 7f, and one on the blizzard 37b. When emptied on the galley, which is generally in the centre of the room, a slug is put at the head having a number upon it, which is that which the compositor carries, and which serves to stiffen this short take and prevent it from pieing. Against it in some offices a chalk mark is made showing its number. If the take is incomplete this is all until the remainder is added, but when that is done a line is drawn under the chalk mark and the next take below is closed up to the other. New York offices commonly use a piece of paper for this purpose, but it is likely to be blown away in summer when the windows are open. It is not considered good practice in a large office to empty part of a take while the remainder is incomplete, unless the takes are very large. The office proves the galley. In a book office the compositor writes his name at the head of his copy, as a guide to the proof-reader, while serving to identify it. In the office of the New York Typothetæ are takes of copy having the names of the compositors upon them which were set nearly seventy years ago.

Take In.—To cause more words or matter to get into a line or page.

Taker-off.—The person, usually a lad, who receives the sheets as printed off and places them on the heap.—*Jacobi*.

Taking of Copy.—A take.

Taking Off.—The act of taking the sheets and placing them straight as printed off.—*Jacobi*.

Taking-off Apparatus.—The special arrangement for automatically taking off the sheets as printed.—*Jacobi*. The delivery or fly-tapes.

Taking-off Board.—The board on which the sheets are laid as printed off.—*Jacobi*. The delivery-board.

Tall.—Tall copies of books are those which were printed upon sheets slightly larger than others, or which have been less trimmed by the binder. In the early ages of printing paper was very irregular, and remained so until paper was made by machinery. One sheet would be an inch or inch and a half longer or wider than another. When the requisite number of copies had been printed the binder picked out the sheets which would match the best. Some were tall and others were broad. A few had a very scanty margin. Tall copies of desirable books sell for a much higher price than other copies. They are selected copies and have not been cut down by the binder, as most old books have been.

Talonaria (Sp.).—Ornamental initials.

Tamborilete (Sp.).—Planer.

Tamboriletear (Sp.).—To plane (a form).

Tanda (Sp.).—Gang or group of workmen; the hands employed on each press.

Taped Work.—A description of bookbinding in which the sections are stabbed through the back with long flat stabs, through which tapes are inserted and fastened on the covers.

Tapes.—The narrow webbing which carries the sheets from the feeding-board to the delivery on a press.

Tapón (Sp.).—Wad or cushion of paper or cork, placed in open forms to prevent soiling the sheet when printed.

Taquer (Fr.).—To plane down.

Taylor, Alva B., an early press-maker of New York, who was by trade a blacksmith. He entered the Hoe establishment when it first began making iron presses, about 1822 or 1823, and remained there as the foreman of the mechanical branch until he began in business for himself in 1842. In this he was moderately successful, but his sales never amounted to as much as those of the firm which he had left, of which he was for a long time the only competitor. An explosion of the steam-boiler in his establishment forty years ago destroyed many lives as well as inflicted much pecuniary damage upon him. He retired from active business after the war, its labors being performed by others, and died in 1889, being then eighty-six years of age.

Taylor, Charles H., a newspaper editor and publisher of Boston, was born in Charlestown, Mass., on July 14, 1846. He began working in a Boston printing-office at fifteen years of age, and the next year enlisted in the Thirty-eighth Regiment of Massachusetts Volunteers, being in the field about a year and a half. He was badly wounded at Port Hudson, and in consequence was sent home. After his return he worked as a compositor, learned shorthand and became a reporter. In 1869 he became private secretary to Governor Claflin and a member of his military staff with the rank of colonel. In 1872 he was elected to the Legislature, and the next year became Clerk of the House. In the latter part of that year he took charge of the Boston Globe, then a little more than a year old. For five years it was unsuccessful, although a readable paper; but in 1878 it was reorganized as a two-cent paper. Its success has been remarkable. In its mechanical department many improvements originated by him have been introduced.

CHARLES H. TAYLOR.

Taylor, Douglas, a printer of New York, was born in Duane street in that city on September 12, 1830. His father, the Rev. Robert Lindsay Taylor, was a teacher and Episcopal clergyman. Douglas Taylor when a boy studied law in the office of John W. Mulligan, master in chancery, and then became a clerk with Sather, Church & Co., bankers, subsequently Drexel, Sather & Co.

In 1848, infatuated with politics, he became clerk and reporter in the office of one of the prominent Democratic journals of the day, the New York Globe, which was carried on by Caspar C. Childs, a leading politician. Connected with this was a book and job printing office, which Mr Taylor purchased in 1855, having through newspaper life and political ambition drifted into printing and publishing. He was editor and part owner of the Sunday Courier for several years, and was for a considerable time a writer for Democratic papers. He was the organizer of the Manhattan Club, the chief Democratic club of New York, and was active in all political affairs before his majority and for a score of years afterwards. He has been prominently connected with clubs, societies, the Seventh Regiment, and literary and dramatic associations. During the terms of Postmasters Fowler and Dix, just before and after the outbreak of the Civil War, he was assistant stamp and envelope agent in the post-office, and subsequently he was elected and appointed to school offices. In 1864 he was unanimously elected Commissioner of Jurors of New York by a convention of the judges and supervisors, consisting almost equally of both parties. This was an office of great responsibility and power. His two predecessors had been eminent as jurists. He received the position on the nomination of Chief Justice Charles P. Daly, Chief Justice A. L. Robertson being the presiding officer. He held the place for eleven years, and until it was made a mere charter office. During the same period he was appointed by President Grant and Congress as one of the commissioners to represent this country at the World's Fair in Vienna, and he was subsequently a commissioner at the exposition in Philadelphia in 1876. Since that time he has held no public office. His printing establishment, at the southwest corner of Nassau and Fulton streets, where he had been for thirty-five years, was suddenly and completely destroyed by fire in September, 1891. This building was a landmark. It had been occupied by many printers since its erection in 1835, including Seth W. Benedict, the Sun and the Commercial Advertiser. Many valuable relics were destroyed in the flames. Mr. Taylor immediately began business again at No. 8 Warren street. Work in the printing-offices now consolidated in his has been continuous since 1806, beginning with D. & G. Bruce, and continuing through Mahlon Day and his successors. Ever since entering the trade he has taken an active interest in everything respecting printers. He was a member of the original Typothetæ, which began its organization in 1863, and was the most earnest and active of those who revived it in 1885. Since the formation of the latter he has been chairman of the executive committee, vice-president and chairman of the committee on arrangements for the Franklin dinners. Many of the speeches delivered at those banquets have been finished orations, and are permanent additions to the literature of the country. He has also been chosen a delegate to the various meetings of the United Typothetæ. He is a well-known print and book collector, and as such has made several trips to Europe.

DOUGLAS TAYLOR.

Taylor, Jacob, an early printer of Philadelphia, as appears by the Journals of the Assembly in 1712. Hildeburn regards him only as a contractor.

Tea Paper.—Paper cut to set sizes for holding certain weights of tea.

Technical Instruction in Typography.—This has not yet been attempted in any American city, although the matter has been discussed in Cincinnati and some other places. There are two objects in having schools for this purpose. One is that defects in original instruction may be remedied, and the other is to teach how additional knowledge may be gained. When the apprentice has passed his four or five years, in whatever place he may have served, there are many things which have not come under his observation. He may know how to impose an eight-page form and not a sixteen; he may be a fairly good job compositor and yet know nothing about the setting of a book title; or he may be an excellent newspaper hand and still be totally uninformed about job-work. He is apt to believe that there is some hidden mystery here; but such an inference is wrong. All that is required is a little more instruction with care and patience. This information can be obtained in the technical schools. The pupil, however, who wishes to be more than a mere worker, and aspires to the control of an office and ultimately its ownership, needs far more knowledge. All processes should be opened to him, and all hidden things laid bare. If the teacher in such a school is really well informed and loves his calling the scholar will learn most that he desires to know. To acquire the art completely, however, is not given to any man. It is so vast, and many parts are so complex, that a lifetime is not long enough to acquire the whole.

The method in the English schools is to have some cases filled with type in the school-room so that actual examination of work can take place. Manuscript is supplied to the candidates. It is intended to be a test, not so much of mere ability in composition as of general intelligence. Tests are made of skill in setting up any kind of matter which may fall in a compositor's way; for instance, a piece of bad manuscript, a simple displayed title-page or heading, a difficult piece of punctuation, a moderately complex table, a line as in algebra, or a foreign paragraph in fairly good handwriting. The teacher takes up each evening the subject which he has previously assigned to his class, and asks questions and gives explanations upon it. The examinations at the City and Guilds of London Institute comprise the following questions, the phraseology of a few being altered so as to correspond to that used in America:

SECTION 1. *Typography.*—Composing: The various sizes of type in use and their mutual relation; tools and appliances used by the compositor; casting-off manuscript copy; estimating the number of ems in a form; estimating the relative labor value of the same sized page in different types; arrangement of pages of matter on the stone; method of determining the margin and furniture, and way of locking up; arrangement of title-pages and other display matter; peculiar accents and signs; composing and distributing by machinery; mechanical quoins and other means of fastening type securely in chase.

Presswork: The various kinds of hand-presses in use; the regulation of the pressure; the tympan, frisket and blanket; making register; treadle machines; various kinds of rollers, their composition, mode of manufacture and treatment in hot or cold weather; composition and properties of typographic inks, black and colored; effect of some metals on colored ink; various kinds of power-presses, platen, single cylinder and perfecting; classes of work best suited for each; making ready of wood-cuts; defects incidental to power-press work, their cause and remedy; schemes of imposition for laying down electrotype plates; qualities of paper best suited for illustrated and other work; sizes of paper; leaf metals, bronzes and dusting colors.

Warehouse: Sizes of paper; relative weight; special qualities for different purposes; sizes of cards; hot and cold pressing; hot and cold rolling.

SEC. 2. *Stereotyping and Electrotyping.*—Reproduction of type forms by the paper, plaster and other processes; preparation of the flong and taking the mold; composition of stereotype metal; casting the plate; turning, planing and finishing; plaster molds and method of casting from them; reproduction in copper by the electrotype process; principle of the galvanic battery and method of construction; the dynamo machine, theory of its action; composition of solution for depositing trough; molding; metal for backing up; possible accidental defects and their remedy; method of producing perfectly level plates; facing with steel, brass and other metals; various methods of making process blocks for surface printing.

Such instruction must be constantly varied by examples of the theory spoken of, if it is possible to have it in the school-room. Questions must be asked and invited. The class must not suppose that the teacher can answer only the questions he himself asks. The pupils must be taught to think. Take, for example, imposition. Obtain a sixteen-page paper in two parts. Show why the 1 and 16 must be together, and the 4 and 13, and show how the inset, or pages 5 to 12, could very easily be the outside sheet if there were any reason. Explain why the margin between the pages is so narrow, while that at the head is greater. Ask the class if any eight-page form can be so imposed that an off-cut of four pages could be used anywhere except on the outside or between the 4 and 9, and show that it can be put between pages 2 and 3 and 6 and 7 of the main sheet, the inset then counting as 3 and 4, 9 and 10. If a newspaper is set by four men, half in bourgeois and half in nonpareil, one-third being leaded, how many more men will it take to get it out if it is set in brevier, minion and agate, one-third of each, and having no leads?

The school for printers' apprentices at Leipsic lately numbered two hundred pupils, who were divided into six classes. Eleven teachers, three of whom were compositors and two pressmen, instructed on four week-day evenings. Besides instruction in the technicalities of the trade, the German and the Latin languages were taught, as well as accounts, drawing and geometry. Several times during the year the pupils were conducted over paper-mills, machine factories and other establishments connected with printing.

Tela (Sp.).—Cloth of various kinds for covering the tympan or cylinder. Tirada en tela, impression from silk, tulle or other fabrics.

Telajo (Ital.).—A chase.

Telegraph.—This word, a Greek compound, signifies to write at a distance. Before the discovery of the electric telegraph it was used to indicate any method of rapidly conveying knowledge by signals, as, for instance, between Sandy Hook and New York. Peculiar flags being hung out at the former place indicated that a certain vessel was in sight or had passed. An observer upon a tower in New York, armed with a telescope, watched for these signals and translated them for others; but generally speaking at the present day a telegraph means an electric telegraph. In this an electric current is conveyed along a wire from one place to another, and messages are conveyed by the stoppage and movement of the current. A long contact signifies one thing, a short one another, and combinations of short and long in different ways represent still other ideas. The instruments used for land telegraphs are of two kinds—sounders, which indicate by sound, and recorders, which record the signals. Many persons have laid claim to the discovery of telegraphing or a portion of the process; but it is generally conceded that this honor belongs to S. F. B. Morse, an American, who in 1844 succeeded in having a message sent by wire from Washington to Baltimore, and who made the invention available to the public. It is not intended here to enter into any details upon the art of telegraphing, but simply to note the effect that its discovery has had upon printing and newspapers. Before 1849 newspapers received short dispatches from their agents and friends when any remarkable event happened, but after that date the collection of news to be transmitted became more systematic, and every large daily newspaper and many small ones received some dispatches every day. Combinations of journals in neighboring localities were organized, so that this supply might be regular, cheaper and more abundant. This growth of telegraph news has become so general that one association now pays $70,000 a month on that account. A single newspaper may receive from two to six pages in a day, each page having from seven to twelve thousand words. The result has been in America that the local centres have become nearly as important in dispensing news as the large. In 1860 the New York daily papers had an unquestioned superiority over all others in the

United States. The growth of other communities and the ease with which news can be sent by telegraph have changed this. Political intelligence and knowledge of accidents and disasters are as fully related in Boston, Cincinnati and St. Louis as in New York, Philadelphia or Chicago. Each newspaper is hampered mechanically. It can send its copies from one to three hundred miles only before it meets other journals with the same general news, while having more news interesting to that particular locality. No large number of New York daily journals are taken in Worcester, Mass., or of Chicago newspapers in Dayton or Columbus, Ohio. Each can circulate largely only in its own vicinity.

Telephone.—An electrical instrument by which information can be conveyed by sound, now very much used. Editors' houses and their offices are now frequently connected in this way, and reporters find them valuable for the transmission of news or for consultation with city editors.

Tenakel (Ger.).—Copy-holder.

Tener Cera (Sp.).—Said jocularly of a proof which has many corrections.

Tennessee.—One of the United States of America bordering upon the Mississippi River. Printing was established at Knoxville in 1793, R. Roulstone beginning the Gazette at that time. The total number of newspapers and periodicals published in 1810 was 6: in 1840, 46; 1850, 50; 1860, 83; 1870, 91; 1880, 193; and 1893, 293. In 1880 there were 12 daily and 172 other periodicals; in 1893 there were 20 daily and 273 other periodicals. The principal places where printing is carried on are the cities of Chattanooga, Knoxville, Memphis and Nashville, the last being the capital and much the largest.

Tentemozo (Sp.).—The piece of wood against which the frisket rests when raised.

Terminology (of a science or art).—That branch which teaches the meaning of its technical terms; also the aggregate of these technical terms. In some sciences it is of particular importance, as in botany, in which not even a leaf can be described without an agreement on certain technical terms. The terminology is generally derived in a great measure from the nation which has done most for a particular art or science, as the military terminology from France, the naval from Holland or England, the musical from Italy, and cooking from France. When a large technical work is to be executed it is well to provide the proof-reader with a lexicon of the particular art or science which relates to the subject. More than it will cost will be saved in the reading.

Ternions.—A bibliographical expression for three four-page sheets nested into each other. A quaternion is when four such sheets are thus combined, and a quinternion when five are arranged together. These methods of printing and binding were common in the fifteenth and sixteenth centuries. An example will here be given of the ternion. Sheet A, or the first sheet, will have 1 for its first page and 12 for its last; on its inside the pages will be 2 and 11. The second sheet will have on its outside 3 and 10, and on its inside 4 and 9; and the third sheet will have on its outside pages 5 and 8, and on its inside 6 and 7. Printed thus and put together thus the pages run regularly from the first to the last, the book when opened in the centre flat on a table having pages 6 and 7 before the eyes, and the pages nearest the table being 1 and 12.

Terno (Sp.).—Job in which three sheets are inserted one in the other.

Testiere (Ital.).—The furniture at the head of a page.

Testino (Ital.).—Brevier.

Testo (Ital.).—Body sixteen of the Italian series, being about equivalent to Columbian.

Tête Dorée (Fr.).—Gilt top.

Texas.—A very large State of the American Union, lying on the Gulf of Mexico, originally a part of Mexico and entering the United States by treaty. Printing began in 1830 at Brazoria, when the Texas Gazette and Brazoria Advertiser was founded. Other newspapers were begun at Brazoria, Houston, Galveston, Austin and San Luis before 1842. The total number of newspapers and periodicals in 1850 was 34; in 1860, 89; 1870, 112; 1880, 280; and 1893, 678. Of these there were in 1880 30 daily, and in 1893 52 daily papers. The principal places in which printing is executed are Austin, the capital, and Dallas, Fort Worth, Galveston, Houston, San Antonio and Waco.

Texto (Sp.).—Fourteen-point or English body.

Thick and Thin Rule.—In England, the rule known in America as light and heavy.

Thick Leads.—In England leads cast four to the pica in thickness are generally thus termed, though thicker leads or clumps are cast.—*Jacobi.* In America, leads thicker than six to pica.

Thick Spaces.—Spaces cast three to an em of any particular body—the average space used between words.

Thin and Middling Spaces.—These spaces are cast respectively five and four to an em of their own body, and are kept mixed together in one box in the lower case.—*Jacobi.* It is much better to separate them and have them in two boxes.

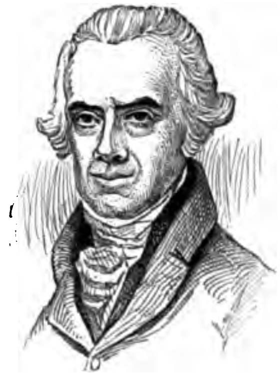
Thin Leads.—Leads cast eight to the pica in thickness are generally thus termed, though thinner leads are cast.

Thirds Cards.—In England a size of card—cut 3 by 1½ inches—used as a gentleman's visiting or address card.

Thirty.—This word, written at the end of the telegraphic dispatches received by newspapers, indicates that they are finished. It is written in figures, "30."

Thirty-twomo.—A sheet of paper folded into thirty-two leaves, generally written 32mo.

Thomas, Isaiah, an early printer of Boston and Worcester and the author of a History of Printing in America, was born in Hempstead, N. Y., on January 19, 1749, O. S. His father, who was of a roving disposition, died in North Carolina in 1752, and the widow remained on Long Island till the boy was six years of age, when she returned to New England, from which she originally came. Soon after this Isaiah went to work for Zechariah Fowle, a printer of Boston, and was indentured to him in 1756. In order that the child of seven years might reach the boxes to set type he was mounted on a bench eighteen inches high and of the length of a double frame. He had not then been taught to spell, although he knew the letters. Fowle was very illiterate and knew little about printing, but between 1758 and 1761 he had a partner, Samuel Draper, from whom the apprentice received much knowledge. At the age of seventeen, having profited by the instruction received from Draper and Gamaliel Rogers, another old printer, Thomas had become a good workman. In 1766 he had a quarrel with his master, and intended to go to London to learn his trade more perfectly. He could not obtain the means, however, and



ISAIAH THOMAS.

stopped at Halifax, where he wrought for the government printer, whose name was Henry. The newspaper there issued was remodeled by Thomas, who also prepared the copy. A paragraph appeared in its columns saying that "the people of the province were disgusted with the Stamp act." The master was reprimanded, as was the journeyman. Two or three other things which he did displeased the colonial authorities, and he was obliged to return to Boston. Shortly after this he voyaged to North and South Carolina. He obtained employment at Charleston, in the latter State, but returned to Boston in the spring of 1770. In July he issued the first number of the Spy, the chief Whig journal of the Revolution. The older Boston papers, with one exception, were not so outspoken as this was upon the differences between the mother country and Massachusetts, and he voiced the sentiment of a multitude of the community. For a very revolutionary article he was ordered to come before the Governor and Council, but refused to do so. They thought of committing the printer for contempt, but met two difficulties. He had not appeared before them, and the contempt could only be constructive contempt. The other was that the Governor and Council did not constitute a court having jurisdiction of crimes and misdemeanors, and consequently could not exercise the power of a court to commit for contempt. The Attorney General was then ordered to prosecute Thomas for a libel, but the grand jury refused to find it. These attempts resulted in a great increase in the popularity of Thomas, and an added circulation to his paper. When hostilities broke out he sent his family to Watertown and his printing materials to Worcester. A few days later he again began his journal in the latter town. For the next three years his life was uncertain. Part of the time he was on a farm, part conducting his journal, and part on distant journeys. After 1781 his progress in business was rapid. He enlarged his newspaper, did job printing, and published books and pamphlets. For two years the Spy was discontinued, as government had laid a stamp act on paper. Towards 1790 his business was rapidly extended. He built a large paper mill and made his own paper. He established an extensive bindery, and he sold at wholesale and retail his own publications and all new works from the presses at London. A Boston office was established. His business extended to almost all parts of the Union. At one time he had under his control and that of his partners sixteen presses constantly employed, seven of them at Worcester. He had five book-stores in as many different towns. He was entitled by Brissot de Warville "le Didot des États-Unis," and by Dr. Franklin the "Baskerville of America."

In 1802 Thomas relinquished his business to his son, who bore his name and shared his tastes. He dispensed elegant hospitality and began the collection of books, in particular the files of American newspapers. His leisure he turned to account in the preparation of his History of Printing, in two volumes, which appeared at Worcester in 1810. It contains much which must otherwise have been lost, and is both full and accurate. A second edition, issued in 1874, has many inaccuracies, but it also has some matter gathered by Mr. Thomas after the first edition came out. In 1812 he began to think of establishing a library and founding a learned society. A bill for this purpose was signed that year, and Mr. Thomas was elected the president of the American Antiquarian Society, which was the title assumed. Upon his death his benefactions were found to have equaled fifty thousand dollars. He died on April 4, 1831.

Thomson, John, press manufacturer, was born in Banffshire, Scotland, in 1854. His boyhood was spent in Marion, Wayne County, N. Y., and he entered a jewelry store at Rochester, N. Y., in 1870. Two years afterwards he had complete charge of the repairing department, and during this time learned mechanical drawing as well as pursued other scientific studies. In 1878 he entered the Colt establishment at Hartford, and since has been in charge of the press department there. Over forty patents have been issued to him personally. He is a member of the American Society of Mechanical Engineers and of the American Society of Civil Engineers, and has filled many positions as engineer and expert. He is now the president of the John Thomson Press Company.

Thorne Typesetting-Machine.—A very ingenious machine invented about 1880, and since then used in many offices in England and America. The typesetting-machine and the distributing machine are in one, the former supplying type fast enough for the needs of the operator and no faster. Justification is done by hand. The machine does not occupy a space of more than ten square feet. It consists primarily of two cast-iron cylinders fifteen inches in diameter, placed one above the other on the same axis. In the surface of these cylinders are cut ninety longitudinal channels, in depth nearly equal to the length of a type, and corresponding in width to the body of the type to be used. The channels of the lower cylinder or setter are fitted with words corresponding exactly with nicks on the edge of the type, no two characters having the same combination of nicks. The upper cylinder is the distributor, and into its channels are loaded type, face out, from a special galley. The distributing cylinder revolves above the setter with an intermittent movement, pausing an instant at the points where its channels coincide with those of the lower cylinder. The lowest type in each channel soon finds a combination of grooves corresponding with its nicks and drops down. They cannot, under any circumstances, go into any except the proper groove, and as each of the ninety channels coincides or matches one hundred and fifty times per minute the speed of this automatic distributor is equal to any call upon it. In the typesetter, letters are dropped from the bottom of each groove in the lower cylinder when an appropriate key is touched upon the keyboard, which resembles that of a typewriter. Each type is pushed out upon a rapidly-revolving horizontal disk, a short curved guide starting it in the right direction. The disk carries the type quickly to the right-hand front of the machine, where it is received on an endless belt, which transfers it to a lifting apparatus or packer, when each successive type is placed in proper position on the line. From this the type passes to the justifier, who sits at one side, and completes the work. A little case of spaces is in front of him, and a case is within easy reach. The letters on the keyboard are arranged in reference to the frequency of their use, so that many combinations can be played at one stroke.

Thousands.—In casting up the value of composition type is reckoned by thousands—ems in depth and ens in width.—*Jacobi*. In America the em is taken as the standard each way. The number of ems in one line is multiplied by the number of lines, and the result is the number of ems in that page. Thus a page 25 by 42 contains 1,050 ems. Payment is made by this standard of thousands, the lowest in the United States being fifteen cents and the highest about sixty. At one time after the discovery of gold in California two dollars and a half were paid for the composition of a thousand ems in San Francisco. On newspaper-work in the day-time hands will set from thirty-five to fifty thousand ems in a week, the former being slow workmen. Some will exceed the higher figure. On bookwork not much over two-thirds of this is accomplished.

Three-Color Machines.—Machines adapted for printing in three colors.

Three-Line Letters.—Letters used as initials at the beginning of a book or chapter, and let into the text to the depth of three lines.

Three-Quarter Frames.—In England, a frame wide enough for cases to be put into the rack underneath the case at which the compositor works.

Throw-off Impression.—An apparatus attached to a press for throwing off the impression while it is running.

Throwing Out a Map.—This is to mount a map upon a guard the size of a page, so that when the map is unfolded it will remain constantly in view, no matter what part of the book is opened.

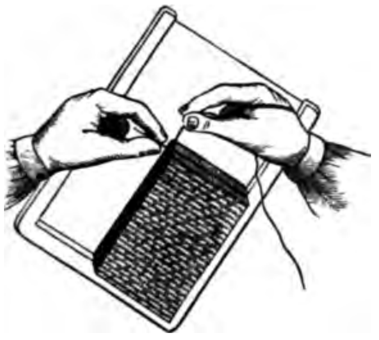
Throwing Quadrats.—In England performed with nine em quadrats, which are shaken in the hand and thrown on the imposing surface, the nick side when uppermost only being reckoned. This is known as jeffing in America, as it is sometimes called in England.

Thumb-Piece.—The ear or piece of the frisket which is caught in turning up or down the frisket on the hand-press.

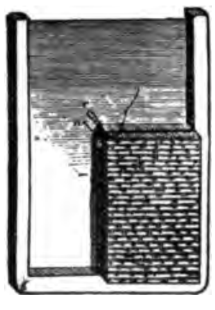
Thurston, Brown, a printer of Portland, Me., was born at Winthrop, Me., on October 6, 1814, being the oldest son of the Rev. David Thurston. In 1831 he went by stage to Lowell, Mass., and there learned the printing art in the office of the Lowell Observer. After being employed a few months in New York he went on a whaling voyage, which lasted four years. He then resumed his trade, and in 1840 started an office in Augusta, Me. The next year he removed it to Portland, arriving on November 9, 1841. On the following day he began business, and has continued it ever since. He was the first to employ the cylinder press in Portland, and also introduced stereotyping, electrotyping and wood-engraving. He was burned out in the great fire of 1866, but soon resumed operations. In 1877 he was the president of the Maine Press Association, before which he delivered on January 17 of that year an historical address describing the progress of the art in Maine and elsewhere, and is now president of the society of master printers in Portland. He has been an active temperance and religious worker, and was actively concerned before the war in the underground railroad.

Tickets.—Little pieces of printed paper or cards, used as reminders or memorandums. The printing of these constitutes a large part of the business of a job office, and a certain class of tickets is used by every printer to check off work. One is attached to each order as it goes out to the workmen, and accompanies it on its entire journey around the establishment. These vary in different establishments, some including much more than others. Upon them every detail of the job or work should be given. Tickets printed for customers are divided as ball, commutation, coupon, deposit, dinner or festival, election, excursion, passage, railroad and miscellaneous.

Tie Up.—Pages of type when made up are for convenience of handling tied up with page-cord and placed on the stone or imposing surface. The matter is generally on a brass galley, which should have a low edge. The type is pressed up firmly against the head by the left hand, in which also is held the end of the cord. With the right hand the cord is passed tightly around the top, lower side and bottom of the page. At the corner it passes over the cord at its place of beginning, and this continues till the whole length of the twine has been used, usually enough to pass around four times. When it approaches the end it is pushed down by a composing-rule behind the cord that was previously there, drawn as close to the corner as possible, forming a V below the winding cords, but with the extreme end projecting above them and the page, usually three or four inches. If this winding has been well done the page is now perfectly secure, but as the cords are a little above the centre of the shank the page is slid out upon the galley and they are pushed down until they are at the centre of the letter or a little below it. When it is necessary to untie the page the loose end of the cord should be taken hold of and pulled out. This must be done on a galley or on a stone. If on a galley, press up the matter as the cord is unwound. If in a form the inside pages should first be untied, the furniture closing up against them as fast as the cord comes away. If matter is to be tied up and stowed away for distribution at some future time most printers wish the leads, Italic, fancy type, head-lines and the extra sorts taken out first. The type when tied up is put into paper. The paper may be anything which will keep the dust off. Pieces are cut about twice as wide as the page is long. A little of the margin folds over the face, and when one turn is made the extra paper is folded over smoothly. Two or three turns are all that are required. But no type can be well papered unless it has first been securely tied.



TIEING UP A PAGE.



PAGE TIED UP.

Tiegel (Ger.).—The platen.

Tight Back.—In binding a book, to fasten the cover solidly to the back so that it does not become hollow when opened.

Tight Justification.—Matter justified more tightly than necessary.

Till.—In a wooden hand-press, a plank running across from one side of the press to the other, a little lower than the head, but considerably higher than the platen. In its centre was a square hole, four inches and three quarters each way, through which passed and was steadied the hose or receptacle to hold the spindle in its true position. To fix and strengthen the hose properly seems to have been the whole object of the till. It was sometimes called the shelf.

Tilloch, Alexander, an early stereotyper, was born at Glasgow, Scotland, on February 28, 1758. In 1781 he conceived the idea of making solid plates, and entered into partnership with the brothers Foulis, the eminent printers, for this purpose. Several books were issued, the invention then being abandoned. A few years afterwards Lord Stanhope took up the idea and had the daily attendance of Mr. Foulis for many months, as well as being waited upon by Mr. Tilloch. For these services they were paid eight hundred pounds. Mr. Tilloch was for a while with his brothers, who were tobacconists, but for some time he carried on printing. In 1787 he went to London, where he spent the remainder of his life in literary and scientific pursuits. He became editor of the Philosophical Magazine, and editor and part proprietor of the Star, a daily paper. He died on January 26, 1825.

Time.—Work in printing-offices is done in two different ways, by piece-work and by time. The wages of pressmen are paid upon calculations of time, and so are those of warehousemen, clerks and boys. In the composing-room the foreman and proof-readers are thus paid, together with some of the men, and even that part of the work which is executed by the piece needs additions to be made to it by time-hands before it is complete. It is, therefore, of the utmost importance to keep an exact record of the time of an establishment. If estimated at too small a figure the master printer is wronged, and if too large the customer is cheated. This object is attained by keeping time-books in each department, some one acting as timekeeper, and the final transference of their contents to the counting-room, so that it may be known that each man has done a full day's work. For the purpose of charging the customer it is also necessary to know how much of the labor of each man was upon each particular order. Third, it is desirable to check the order in which each job goes out, so that there shall be no loss of time by the compositor, the pressman or the binder. Were this precaution not observed the time entered in the books might be exact, yet all would not be accounted for. The compositor might return three hours on A and six hours on B; but without comparison the office could not know whether a whole day had been worked or not. Time, therefore, in a printing-office means keeping registers in such a way that the presence or absence of the workman is noted; that the particular jobs he is employed on may be indicated, with the number of hours for each, and their time of beginning and termination, so that all of his time shall be accounted for, even to the smallest fraction.

COMPOSITORS' BOOK FOR WEEK ENDING JUNE 21, 1894.

NAME.	Monday.		Tuesday.		Wednesday.		Thursday.		Friday.		Saturday.		Total.
J. G. Henry	✓	✓	✓	✓	✓	✓	✓	✓	—	—	✓	✓	49
John Thomas	✓	✓	—	4	✓	✓	✓	✓	✓	✓	✓	✓	53
David Burr	4½	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	58½
William Todd	✓	✓	✓	✓	4¾	✓	✓	✓	✓	✓	✓	✓	58¾
James Best	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	59

TIME OF	JAMES W. BOSWELL.							August 12, 1891.	
Hours at Work 10½	No. 1705	No. 1706	No. 1710	No.	No.	No.	No.	No.	
Time of Composition, Make-up and Stone-Work	2.	.30	1.30						
Other Time-Work on this job not to be charged to author . .	1.15	.45	—						
Alterations made by Author	.30	2.30	.15						
Extra Reading and Revising	—	—	—						
Overtime, Extra	.30	—	—						
General Office Work not to be charged to any job (enter in the last column)									.45

In a small office, employing not more than six or seven men in a department, time is kept by the foreman, if there is one, and if not by the employer or some person whom he designates. There are two hours for beginning work in the United States, and three customs in different places concerning the noon intermission. Work begins at 7 or 7:30 o'clock in the morning, and continues until 12 or 12:30. In country places there is generally a whole hour allotted to dinner, from 12 until 1; but in cities some offices shut down from 12 to 12:30, and others from 12:30 to 1. All close alike at 6 o'clock, except on Saturday, when 5 is the hour. Thus the week is fifty-nine hours. The offices where a shorter day is observed are now so few that in proportion to the whole number they need not be reckoned. Within the last dozen years a practice has sprung up in the large cities of giving a half-holiday on Saturday, and it bids fair to be universal. The payment for this broken week is, if five hours are taken off, fifty-four fifty-ninths of the whole week; and if four hours are taken off, fifty-five fifty-ninths. It has been a disputed point between workmen and their employers, if the exigencies of the establishment demanded overtime, whether this ought to be computed after the whole fifty-nine hours are made up, or from the fifty-four or fifty-five. Abstractly it would seem that the former was right.

In an office of any size a time-book for the workman is kept. It is ruled so as to show each half day, and at the end is a column for totals. This book is only a temporary one, kept in lead-pencil or ink, and its results are copied in a larger book. It appears as above.

Each man is checked as he comes in, morning or afternoon. If no greater loss than fifteen minutes is shown this deficiency is not put down. The compositor's "arrived" is indicated by a bookkeeper's tick; but if he goes away before noon or 6 o'clock the figure of hours worked is written over it. Entire absence is indicated by a dash.

Each job or order as it comes in is accompanied by a ticket; it may have very few particulars, or it may have many. Each job is known by a number, and not by its name. Previous to giving out the order the counting-room should enter it with all its details, leaving nothing to memory or to guesswork. A copy of the whole, with the exception of the price, is sent to the foreman of the composing-room, and another to the foreman of the press-room. Every subsequent change in the order should be entered in the counting-room, and a copy sent to the foremen, who paste the additions on their orders. A blank should then be provided for the workman upon which is to be entered his name, the number of the jobs on which he is employed and the time spent on each. These the compositor fills up, and at the end of the day he turns it in to the foreman. The next day he has a new ticket. His ticket would appear as in the preceding page.

Each of these tickets is consolidated on a book, to show how much time was spent on a particular work, the table appearing thus:

COMPOSITION.							
No. of Order.	DESCRIPTION.	Dates of Time Spent.	Time Composition, Make-up, Stone-Work.	Other Time-Work not to be charged.	Alterations by Author, Extra.	Extra Reading, Revising.	Overtime, Extra.
126	3,000 Pamphlets, medium 8vo. . .	Oct. 20	7.	——	——	——	——
		" 21	20.	——	——	——	——
		" 22	——	2.	——	——	——
		" 23	——	——	3.	——	——
		" 24	——	1.30	10.	——	——
		" 25	5.	——	.30	3.	——
		" 26	——	——	——	——	——
127	500 Envelopes	" 21	.30	——	.15	——	——
128	500 Letter Headings	" 21	1.15	.15	.45	——	——
129	Composition and press proofs of title-page	" 22	4.30	——	.15	——	.30

The number of hours footed up on the compositor's time-ticket must equal the time shown on the page just given. The number of hours on the tickets is also added up in the counting-room, and at the end of the week must agree with the statement upon the men's pay-roll. The tickets should not be destroyed until the job is paid for, as in case of a dispute between the employer and the customer they afford the best possible evidence that the charge is correct. In the pressroom the ticket should be as follows:

TIME OF J. HUBERT. August 12, 1891.								
Hours at Work 10	No. 420	No. 428	No. 430	No.	No.	No.	No.	
No. of Press	3	3	29					
Preparing Paper	.30	.15	—					
Overlay Cutting	—	—	—					
Hours Making Ready	1.30	2.00	.30					
Hours Running	2.00	1.30	1.00					
Impressions	2,000	1,000	200					
Tokens	8	4	1					
Chargeable Detentions	—	.30	—					
Dry-Pressing	—	—	.15					
Overtime, Extra	—	—	—					

After the time which was spent on composition and on presswork has all been reported, its value must be computed for charges against the customer. It is the custom to estimate the time of a press at so much a day. One may be eight dollars a day; another fifteen dollars a day. As a rule most cylinder presses are worth more than the lower figure given. When the charges are made by the token they vary according to the time occupied by the making ready. If that is to be an elaborate one a higher charge must be made than when very little time is occupied. Compositors' charges ought to be doubled for corrections and alterations. There must be enough to pay for reading, superintendence and all the other various expenses of printing.

Time-Work.—Work paid for by a fixed price per hour, distinct from piece-work.

Timpano (Ital. and Sp.).—Tympan.

Timpanillo (Sp.).—Inner or back tympan.

Timperley, C. H., a practical printer of Manchester, England. He was born about 1794, and was apprenticed to a copperplate printer. In 1810 he became attached to the Thirty-third Regiment of foot, and remained in the British service until 1815, when he was discharged in consequence of wounds received at the battle of Waterloo. On his return he resumed the business of copperplate printer, but relinquished it in 1821 for letter-press printing. In 1828 he delivered an address upon printing, and afterwards published the Songs of the Press and a Printers' Manual. In 1839 he issued a Dictionary of Printers and Printing, a collection of facts and anecdotes respecting printers and printing from the earliest times down to that date, arranged in chronological order.

Timpinello (Ital.).—The inner tympan.

Tin.—A metal now used largely in the manufacture of type, adding toughness and diminishing brittleness. Its use for this purpose, although known for many years, has been general only within the last twenty-five. Tin has nearly the color and lustre of silver. In hardness it is intermediate between gold and lead; it is very malleable, and may be beaten out into foil less than the thousandth part of an inch in thickness; it has an unpleasant taste and exhales on friction a peculiar odor; it is flexible in rods or straps of considerable strength, and emits in the act of bending a crackling sound, as if sandy particles were intermixed, called the creaking of tin. A small quantity of lead or other metal deprives it of this characteristic quality. Tin melts at 442 degrees Fahrenheit. Its specific gravity is 7.29.

Tint.—A mixture of a color of the spectrum, or a modification of one, with varnish or with white, so as to lessen its power. The quantity of white must be much larger than that of the other. Very effective backgrounds are thus made.

Tint Blocks.—Blocks or surfaces used for printing colored backgrounds. They are usually in fine lines, but sometimes are solid, the lightness being given to them by large admixtures of white or varnish. Many materials have been used for the substance upon which this ink is to be spread, such as wood, leather, and lead acted upon by chemicals or by sand. One method of making these is by having a strong solution of Epsom salts cover the face of a piece of plate-glass and letting it evaporate very slowly. When dry the glass will be covered with a foliated network of crystals, somewhat like window-glass on a frosty day, except that when properly done the crystals will be separate and not connected at the edges. A mold can be taken by pressure on wax, from which the salts can be washed out by water, and an electrotype taken from this can be printed from. Oxalic acid similarly treâted gives a beautiful crystal, but the depth of the plate must be increased chemically, or used only on fine paper with excellent ink. A block of knotty, irregularly grained wood may be planed across in the direction in which the grain is most distorted. Then soak it in sulphuric acid, and the softer parts of the wood will be burned away faster than the harder parts, so that the grain will appear in ridges and hollows. It may then be electrotyped.

Tinta (Sp.).—Ink.

Tintero (Sp.).—Ink-fountain.

Tipo (Sp.).—Type.

Tipográfico (Sp.).—Typographic.

Tipografista (Sp.).—Typographer, in the sense of one who seeks to improve the art of printing.

Tipógrafo (Sp.).—Typographer, printer.

Tipómetro (Sp.).—Type-measure.

Tirada (Sp.).—Edition or run of any work; tirada en tul, impression from tulle for tint ground.

Tirage (Fr.).—Making the impressions.

Tirante (Sp.).—Draw bar or impression-bar of a press; also brace or crosspiece.

Tirar (Sp.).—To pull an impression; to print.

Tiro (Sp.).—Pull or impression made with the lever or bar of the press; the two halves of a form made by the crossbar of a chase.

Tissue Paper.—The very thin paper used for interleaving plates in books.

Titelzeile (Ger.).—Head-line.

Title.—1. The page of a book which describes the work and gives the publisher's name and the date of publication. 2. The space between the bands of a book upon which the lettering is placed.

Title-Head.—The blank space at the top of a ruled form or invoice left for the printing of the title.

Title-Page.—The first page of a book, giving its name, author, publisher and place and year of publication. It may also contain other matter, and sometimes may not embrace all the information above given. The order is usually the name, author, place, publisher and year. The words do not generally exceed twenty or twenty-five, and rarely rise to fifty. They consequently would not fill a page unless in larger type than the body of the book, and with much more space. The name of the book, therefore, is in duodecimos and octavos in a type somewhat larger than pica, and occasionally as large as two-line pica. In larger books a type of more magnitude is employed. The subordinate lines are in smaller type than the name, and are connected with it or with each other by catch-lines.

To set a title-page properly requires much care, much experience and much taste. Custom has sanctioned only one kind of type for books which are to be preserved, larger or smaller sizes being used. This type must be Roman. The only exception is that black-letter may be employed for some lines; all of the Gothics, antiques and full faces and all the ornamented faces are ruled out. The page must be severely plain. On commercial work this rule is not followed with strictness, and indeed very little attention is paid to it. The Roman spoken of may either be plain capitals or small capitals; it may be slightly condensed or slightly extended. The extended, however, is not regarded as being in as good taste as the other two, and the condensed should generally be condensed two-line letter. Many publishers demand pages entirely in capitals and small capitals of the ordinary width, two-line letter being used for the larger sizes. When condensed is allowed all the considerable lines must be in condensed type. This condensed type must never be a very narrow letter; that which averages a quarter less width than common being regarded as the best.

Title-pages have their first line at the very top. If the experienced workman is consulted he desires to have this a comparatively unimportant combination of words, so as to throw the principal line a quarter or a fifth of the way down. This principal line should if possible extend completely across the page, and should be of such a size and weight as would mark its importance. From fifteen to twenty letters would be enough, in a typographical sense. If more the letters must be condensed in ordinary measures; if less they must be spaced out. It will frequently happen that only a word or two can be given, as in Thomas Noon Talfourd's play of Ion, or the principal word in a sentence like this: Plato, His Life and Ideas. Most authors would desire a line of the word Plato, followed by a comma or colon. Such lines are unfortunate; but the printer must do the best he can with them. Other principal lines in the title must be shorter than the main one, if a whole line, yet generally longer than a half line. Each one goes in the centre, and no two lines must be alike in length. They must vary both in length and in size. When circumstances require two lines near each other to be of about the same importance and the same length one may be widely spaced and the other spaced with no more than a thick space. Occasionally hair-spacing between letters can be practiced.

Each principal line should be separated from the other principal lines in its subdivision of the page by the same space, in which there may or may not be catch-lines, which are the small words like "concerning," "of the," "from" and "and," which join together the more important words. The proper type for them is small capitals. On folios they may be small pica capitals, and on quartos long primer capitals; but on octavos long primer and brevier small capitals; duodecimos, brevier and nonpareil small capitals; and smaller sizes of books, nonpareil small capitals. Between the title proper and the author's name and titles there is a considerable space, and below this another blank space, followed by the firm and year. Above the latter may be the cipher of the publisher, a conventional ornament, or a dash, but frequently only the blank space. If there is an engraving on this page it may be anywhere above this blank, but including it and below the principal line. When there is a second and improved edition with a new editor the name of the latter is below that of the author, with his titles. The place, date and publisher's name should be of good size, comparing with the lines of type next smaller than the principal one on the title. For instance, in a royal octavo small pica is none too large for this purpose, unless the whole page is very much crowded.

To set a title-page well is very difficult. It does not do to trust too much to theory, and good judgment is necessary to know when the right result has been attained. Frequently the author can help out the printer. Having determined upon the main line, set the others in the degree of their importance, then adding the catchlines and the space. Perhaps a better idea can be given of defects in title-pages by citing some books which are well known to printers:

The Printers' Price-List, by Theo. L. De Vinne. Too light and scratchy, being in a light-face letter.

American Encyclopædia of Printing, by J. Luther Ringwalt. Too few words and too large type. Date and place weak.

The American Printer, by Thomas MacKellar. Correctly set.

Journalism in the United States, by Frederic Hudson. Not enough words.

History of the Old English Letter Foundries, by Talbot Baines Reed. A little more space at the top required.

Printing Machinery, by F. J. F. Wilson. Too much matter, the sub-head made too large, too small and too long an imprint, and too great a variety of styles of type.

Fifty Years Among Authors and Publishers, by J. C. Derby. All kinds of type used, and badly proportioned.

Recollections of a Busy Life, by Horace Greeley. Too much matter, and grouped together badly.

Prominent lines, and even the principal one, may run over, and subordinate ones very frequently do. When this happens the second line should be in the centre of the first one and against it; if there are three or four lines a staircase should be made, alike on both ends. Sometimes the author will consent to make a change in his copy to make a more effective title-page. A line like a motto may be transposed to above the main title. Some unimportant line may be omitted, or several lines may be joined in small type, giving more room. Punctuation marks at the end of lines are often omitted. This should never be allowed on a work of information or knowledge, as a dictionary, a grammar or a history, but the disuse should be confined to books of belles-lettres. Borders, as for instance a red line, are sometimes placed around a title-page. In some cases they improve its appearance. It is usual when a title has been printed in a commercial or miscellaneous book and a cover placed on it for the same type to be used on this cover, but with a border. This may be as heavy as is desired, and heavier and fancy lines may be substituted for those which appear weak. Engraved title-pages are now rarely used in books. When there are two languages in a book, and there are two title-pages, they face each other, one coming on page 2 and the other on page 3 of the sheet. There is nothing on page 1. If, however, the volume is one of a series, the series having a full title-page and the volume having one, the former is on page 1 and the latter on page 3. Title-pages, although they look open, are more costly to a printer than pages of plain matter.

Title-Sheet.—The preliminary sheet of a work which contains the title, preface, contents, &c. It is usually printed last, if it is the first edition of a book.

Titling Letter.—The kinds of type more particularly adapted to setting title-pages. In Stower's time they were the capitals from great primer to canon. The word is not now used.

Titolo Corrente (Ital.).—The running title.

Titre (Fr.).—Title.

Tirer (Fr.).—To pull, to prove, to print.

Tiret (Fr.).—Hyphen.

Titulares (Sp.).—Job-type.

Titulo (Sp.).—Title.

Tobacco Papers.—In England, ordinary paper of set sizes used by tobacconists for holding certain weights of that article.

Toe of the Spindle.—The sharp end of the screw in the hand-press which pivots in a cup or hollow of polished metal.

Token.—Half a ream. This has different significations at different places, and is slowly going out of use. Formerly it was two hundred and forty sheets, but of late years paper has been made five hundred sheets to the ream, and a token is, of course, one-half of that. It is counted only on one side for presswork. For instance, a newspaper with two reams of paper would have to pay for eight tokens, four being printed on each side. In England a ream contains five hundred and sixteen sheets, and a token is half of that number. In the New England states a token means four hundred and eighty or five hundred impressions.

Token-Sheet.—A turned-down sheet in a ream of paper indicating a token. It shows the last sheet of that token, and is a guide to the pressman.

Tomador (Sp.).—Fountain-roller or ink-taker.

Tomiza (Sp.).—Coarse twine, used for covering the roller-cores to make the composition hold firmly.

Toned Paper.—Paper made with a decided tint, varying from the yellowish or bluish white, which is the general color. It is toned by adding a little coloring matter when the material is in the state of pulp. A pure white is almost impossible to obtain, almost all paper inclining either to yellow or blue. By adding a little yellow a rich creamy color can be obtained which is very pleasant to the eye, and by different admixtures almost any shade can be produced.

Tonto (Sp.).—Job printed on one side of paper only.

Tooling.—In binding, to place the tools or ornaments upon the leather and make the impression. In blind-tooling this is done without gold. It requires great skill and exactness to be able to execute this properly.

Top Boards.—In England, the upper boards used for laying-on on a printing-machine.

Top Cover.—The upper, beginning, or front cover of a book in binding.

Top-Edge.—The head or top of a book, in contradistinction to the fore-edge or tail.

Top-Gilt.—A book in which the top-edge of the sheets only is gilded.

Top Side.—The front or beginning side of the cover of a book in binding.

Tops.—In stacking work as printed off the warehouseman places a few sheets of each signature on the top, so that they may be at hand if a set of advanced sheets are asked for, thereby obviating the lifting of a quantity of work.

Torchio (Ital.).—A press.

Torcido (Sp.).—Twisted or crooked matter.

Torcoliere (Ital.).—A pressman. His partner at the press is called aggiunto al torchio.

Tornada (Sp.).—Handful of letter (taken up when distributing, &c.).

Tornavis (Sp.).—Screwdriver.

Torta (Sp.).—Package of type, either as it comes from the founder or when papered up to be put away.

Tortis (Sp.).—Name given to an old Spanish face of type.

Tory, Geoffroy, a type cutter and writer upon typography, who wrote in 1529 a book called Champ fleury, dwelling upon the proportions of type. It derived every letter from the goddess IO, and proportioned each to the human body and countenance in their various poses and aspects. He divided the square of each letter into a number of minute squares.

Town Cards.—In England, a size of jobbing card, cut 3 by 2 inches.

Tracing.—In England, examining the made-up pages of a weekly or monthly paper or periodical to see whether all the different takes and galleys are properly made up and ascertaining that nothing is omitted or misplaced.

Tracing-Paper.—A prepared thin, transparent paper used by draughtsmen for copying drawings.

Trades-Union.—A combination of workmen for the betterment of their condition and the repression of abuses upon them. These organizations have now become very numerous in every line which requires experienced hands, and are not confined to the male sex. In the printing trades they are strong and in large numbers. During the Middle Ages almost all skilled handicrafts were exercised by those who had been regularly taught, and if they had otherwise learned their occupation workmen found difficulty in obtaining permission from the authorities to practice it as a means of livelihood. Very few masters had establishments in which more than a score of hands were employed, and indeed in most of them there were only two or three men and boys. Apprentices were held rigidly to their indentures, and personal correction was administered whenever the master thought fit. The journeymen in most occupations wrought long hours, thirteen and fourteen being common, and their earnings were very small, both considered from a money point and by their power of purchasing commodities. They lived under unhygienic conditions, they did without things now thought necessary, and they were frequently buried by the parish. This was the case in London, as well as Edinburgh and Bristol. In the early part of this century all combinations among workmen were unlawful, and leaders in labor revolts were frequently sent to prison or transported. The law and the judges did not consider whether the object to be obtained was itself desirable. All meetings upon the matters which now interest trades-unions were frowned upon, and many gatherings were prevented by the arm of the law. Even in the United States the feeling existed that societies of workmen for other than purely benevolent objects were injurious to the public welfare. Thurlow Weed, who in 1816 endeavored to obtain a charter for the New York Typographical Society, found it impossible to do so unless the organization would agree to restrict its future action to benevolent work alone. This was consented to and the next year a charter was granted.

It is not true, as generally imagined, that trades-unions in the United States are the result of the admission of foreigners into this country, or the adoption of their modes of thought. There was a printers' strike in New York during the Revolutionary War, and a trades-union existed there in 1795. In 1800 a scale was prepared, and in 1809 there was an extensive strike. At this time there were very few foreigners in America. Unions existed, scales were prepared and strikes happened frequently before 1845, which is the date usually given for the beginning of large immigration. The origination of the present International Typographical Union was occasioned by what the men deemed abuses, and not because they desired to assert themselves against those who had been more fortunate in life. Social intercourse was then common between both classes. It has now largely ceased in the greater cities.

The advocates of unions and other like organizations claim that such combinations of workmen are necessary. They take Adam Smith's dictum that there is "a tacit understanding among employers not to raise wages," and they believe that this tacit understanding extends to other abuses. In cotton-mills in England children of the tenderest ages were employed in attending the mules and the spinning-frames for twelve hours a day, often in dangerous places. The mines employed women underground until they became almost like savages. While most individual employers would, if appealed to, have agreed that these practices were wrong, they did not desist from so employing infants and women. A positive enactment was necessary to lessen these abuses. If a workman in any unorganized trade now appeals to his employer to give him more wages, he will probably be met by the statement, which is a true one, that he can get another hand for less. If several men go together, they risk the loss of their situations as soon as the employer can find new men. Except under conditions of extraordinary prosperity, when every man is called for, it is useless to ask for greater wages; and if new machinery comes in to lessen the cost in some other shop or factory wages will be reduced in another which has not the use of the new invention, so that it can meet the competition of the open market. The isolated workman can know little about the conditions of trade elsewhere, nor can he judge whether the representations of his employer to him as to prices paid in other towns are true. For these reasons, and for many others, combinations have been formed among workmen in nearly all manual occupations, by which a very large proportion of those employed in a single town act as a unit in negotiations with their employers. One may be able to discharge the spokesman of his establishment, but if a workman comes to him from another shop, with the tacit concurrence of those in his own, the employer can find no one on whom to wreak his spite, and he is less apt to resist, because he knows that his competitors must grant the same privileges. Upon reasoning like this the original trades-unions in each line were formed. Many advantages are claimed for them. They cause each workman to receive the real value of his labor, or at least as close to it as it is possible to approach. No workman can cut under him, as many greedy ones would naturally do. If any difficult or extraordinary work is to be done he receives the full value and does not need to haggle with his employer. That person, too, in making his charges to his customers, knows exactly what he has to pay, and can allow for it beforehand. Employers are advantaged by this knowledge, as the rate of the union is the established rate and can be taken as a basis, even for those offices which are entirely out of the union. This the late William Blades thought a great benefit. It cultivates habits of self-reliance and teaches the method of conducting parliamentary business. It provides for the sick, the disabled, the widow and the orphan, and its members are able to perform many friendly offices for each other. It establishes in large cities houses of call, or offices where disengaged workmen can hear of places. In cases of strike those who go out are supported by their fellow-members. The hands in other cities who might be drawn to towns where a strike was going on are notified by their officers of the existence of difficulties and are warned not to come; those who have appeared under misapprehension are given means to go away again. Good workmen are encouraged and bad ones are discouraged.

Such, in brief, are the arguments by which those who are members of unions support their value to the workingman as well as to the employer. It is not, they claim, his interest to bid for the lowest prices among those who are condemned by their necessities to struggle against each other. As ordinarily conducted, unions have a president, vice-president, secretary and treasurer. Some have other officers, besides a fund trustee, whose signature is required, together with that of other officers, to draw out money from the bank. There is generally an executive committee, and, in case of a strike, a strike committee. The funds are obtained by the regular dues, which amount from three to six dollars a year, and by assessments, rendered necessary by strikes or by an unusual number of deaths. Sometimes also a tax is imposed by the general organization. Funeral benefits amount in most cases from one hundred to one hundred and fifty dollars, while those organizations which have sick benefits give from five to twelve dollars a week. Among the printers the amount levied upon the members who have not lost their situations during a strike may be 10 per cent., while those who have lost places obtain from five to seven dollars a week if unmarried, or from seven to ten dollars if married. Statistics of the strength of American unions are given under INTERNATIONAL TYPOGRAPHICAL UNION.

Those who are opposed to the typographical unions deny most of the statements given above which show that such organizations are an advantage to the workmen. They point to the fact that the time when workmen most easily found employment and when wages were highest in proportion to commodities was before the Civil War, or from 1850 to 1860. The unions then were very weak. Since 1865 they have continually been growing stronger, and lay down ordinances on every question in which there can be a dispute. Yet workmen have more lost time, find it difficult to get employment when once thrown out, and their annual wages will buy less of the necessaries of life than they did in 1855. They also deny the assumption that there is a tacit combination among employers to keep down wages. Employers of the better grade are always anxious to secure good workmen and are willing to pay the highest rate. Probably not 5 per cent. of the New York offices pay under the union scale. The opposers of unions object to the assumption that employers are grasping or avaricious, more so than all men are everywhere. They resist movements for an advance of wages because they receive their work from customers who would refuse to pay more. A difference of 1 per cent. might cause a transfer to another place; and 5 per cent. certainly would. Yet the smallest change in a scale is always more than 5 per cent., and often is beyond 10. Employers find it difficult now to make both ends meet. Out of nine hundred in New York only about one hundred and twenty-five have any commercial standing, and only about ten or twelve are really easy in circumstances. There is no surplus fund to pay extra wages, unless it can be obtained from the customers. A principal objection by employers to unions is that they do not really secure an enhancement of wages to journeymen. A few men may obtain such a raise, but work diminishes, and consequently less is paid out in the aggregate, as there are fewer hands employed. It also becomes more irregular. Formerly when the feeders in New York offices earned six and seven dollars a week they had employment for three hundred and thirteen days in the year; now, when they are paid ten and twelve dollars a week they are suspended at every time of slackness, and it is doubtful whether in many offices they are at work more than two hundred days in the year. Work in high-priced towns becomes seasonal, and men are hired and discharged on a day's notice. All unions now have a rule that the minimum rate of wages shall be fixed. This acts with hardship upon old and weak men and upon those who are unfortunately slow. Of one hundred men, three or four are worth no more than half the scale, twenty are worth no more than two-thirds, and twenty others fall somewhat below the average. Four or five should receive one-half more, and twenty or so a dollar beyond the usual figure; but as employers are forced to pay a low-grade man the average wages, they refuse to give the best men more than a dollar or two in advance, and none of the others receive anything for their superior dexterity. A bonus, taken from the wages of the good men, is given to those whose ability is small. Another disadvantage which comes from unions is that they cause strikes and dissensions. These difficulties are over minor matters which could be settled by the employer and the employed in half an hour; under the management of a committee irritation is kept up for a week. One of the greatest hardships of a union is its course in preventing non-members from going to work. Where union men are chiefly employed they will not tolerate a non-union man in the same room with them. He may receive the same wages and be personally unobjectionable. He may be in great need, and the establishment may require him.

These do not embrace all of the reasons urged against unions by those who are opposed to them, but they constitute the more important ones. It is singular that among all that has been written for and against unions in the last thirty years, so little really bears upon the matter. Unions are either condemned by wholesale or lauded to the skies.

Trafalgar.—A size of printing-type formerly used in England, smaller than canon, but larger than their two-line double pica. It was about four lines of small pica in size.

Träger (Ger.).—Bearers.

Transfer.—It is frequently desirable to transfer prints made by wood-engraving so that they can again be used. It saves the expense of redrawing and makes a more faithful copy. The back of the print to be copied is moistened with a solution of alkali or benzine, which, soaking through the paper, forms a new combination with the oil in the ink. The black of the ink is thereby liberated, so that it can be completely removed by firm pressure. The print so treated is then laid face downward on the block, and the free black is transferred to the block by the pressure of a burnisher or of a press. The black reappears on the block, but in a properly reversed position, ready for the tool of the engraver.

Transfer Ink.—Special ink for pulling transfers of type or plates for lithographic purposes.

Transfer Paper.—Prepared paper for pulling transfers of type or plates for lithographic purposes.

Transliteration.—The substitution of one letter for another, as in cipher or in the Italian f and the English ph. Thus in Italian Filadelfia is transliterated from Philadelphia.

Transpose.—To shift words, lines, leads or any portion of composed matter from one place to another. This should be done with great care. The mark for transposition is Tr., tr., or simply drawing a line around each part which is to be transposed.

Trar Fuori (Ital.).—To drive out by using a thicker character, thicker leads or more spacing.

Tratto d'Unione (Ital.).—A hyphen.

Trasponer (Sp.).—To transpose.

Travaux de Ville (Fr.).—Job-work; literally, city work.

Traversa (Ital.).—The crossbar in a chase.

Treadle.—The lever which imparts motion to a machine by means of the foot.

Treadle Machine.—Small machines worked by the foot, as distinct from those driven by any other power. They are always small and are nearly always platen-presses. There are many varieties.

Treadwell Press.—The first Treadwell press was not that which was the predecessor of the Adams press, to which it was somewhat similar, but was a hand-press moved by a treadle. The bed was fixed, and the platen, with the tympan and frisket, turned over on the form. There was also a method of reversing the frisket, which was made double, so that on half-sheet work the sheet might be printed on both sides without shifting. Its appearance was much unlike that of any other press. It was patented in England in 1820.

The later Treadwell press was put into operation in Batterymarch street, in Boston, in 1827. It was invented and patented by Daniel Treadwell in 1826. It was a bed and platen press of pretty large dimensions, and was capable of carrying a little larger form than the hand-presses then in use. The bed was horizontal and reciprocating. The press was constructed of very large wooden timbers about twelve inches square and a great quantity of cast and wrought iron. Connected with its huge frame was a wilderness of belts, cams, pitmen, gearings and cranks. Its weight was enormous. A very strong rotating shaft gave motion to its numerous and complicated parts. Nine presses of this kind were used in the Bible House, in New York, at one time. They have not been employed since about 1845.

Treble Cases.—Special upper cases made to hold three sets of capitals.

Treble-Column.—Matter set in three columns. Such matter is charged for at a higher rate than ordinary matter.

Tree-Calf.—Leather so called because the sides of the book imitate a tree, appearance and color being like the grain of wood cut longitudinally and polished. See BOOKBINDING.

Treinta y Dosavo (Sp.).—A sheet folded into thirty-two leaves.

Trembles (Sp.),—Waved rules.

Tremper (Fr.).—To wet.

Trêteau (Fr.).—Stand, frame,

Triangular Quadrats.—These are sometimes used in scripts and in some kinds of fancy type. They are formed thus ▲, and are exactly half an em, taken diagonally.

Triángulo Español (Sp.).—Spanish triangle—an arrangement of headings, &c., in which one or more lines are full and the last one centred.

Triángulo Frances (Sp.).—French triangle—an arrangement of lines where the first is full and the others are successively shorter.

Trigesimo-secundo.—The bibliographical term for thirty-twomo ; written shortly 32mo.

Trimmed Edges.—Edges of books cut or trimmed sufficiently to make them presentable without opening heads or bolts.

Trimmed Rollers.—Rollers for machine printing pared at the ends to prevent the composition tearing off the stocks.

Trimming-Board.—A board upon which a book is laid while the workman trims it.

Trimming.—Shaving the rough edge of the leaves of a book which is not to be cut.

Trindle.—A thin strip of wood or iron used in bookbinding.

Triplo Canone (Ital.).—A size of type in Italy which is on body 72, according to their system ; or, according to the American point system, on body 77, equaling seven lines of our small pica or nearly six and a half of pica. It is used for display.

Trismegisto (Ital.).—Body 36 of the Italian series. It is equal to a three-line pica and a couple of leads.

Trolly.—In England, a form-carrier.

Troup, Augusta Lewis, the latter being her maiden name, formerly corresponding secretary of the International Typographical Union, is a native of New York city. During her childhood she was taken to the country for her health and remained there for several years. Upon returning she entered the Brooklyn Heights Seminary, completing her education at the Convent of the Sacred Heart, Manhattanville. She then began contributing to newspapers, and finally entered the printing-office of the New York Era, from this changing to the World. The Alden typesetting-machine was completed at about this time, and its directors applied to the World for a young lady competent to test it. Miss Lewis was assigned to this duty. She remained here for some time, although she very soon noted a fatal defect in the clogging of the channels, and during her association with Messrs. Alden and Slingerland explained the workings of the machine to visitors, who came from all parts of the globe. She set for G. P. Putnam & Sons while there the entire story of Rip Van Winkle, amounting to 24,993 ems, in solid agate in six hours and thirty-nine minutes, or at the rate of about 3,800 ems an hour. This included both setting and distributing. About this time the compositors on the World struck. The female compositors helped the employers. As soon as the latter made satisfactory arrangements with the union the men were taken back, but the women were discharged. Although still holding a position on the machine, Miss Lewis resented this action and with others formed the Women's Typograpical Union No. 1, becoming its first president. It received a charter the next year, and Miss Lewis and Eva P. Howard represented it at the next session of the International Union at Albany. It then had forty members. At the next session of that body in Cincinnati Miss Lewis was elected corresponding secretary. The Women's Typographical Union was the first organization of women in the printing line in the United States, and she was the first, and up to the present time is, the only lady who has been an officer of the national organization. She discharged the duties with ability and tact, and was highly commended by President Hammond at the next meeting. In New York city she was warmly interested in social reform, and visited tenement houses and factories to inspect the conditions of life and labor. On June 12, 1872, she was married to Alexander Troup, who had been very active in organizing the printers of the country into unions. He was secretary and treasurer of the International Union in 1866 and 1867, and is now publisher of the New Haven Union. He has also been twice a member of the Connecticut Legislature, and for four years was Collector of Internal Revenue for Connecticut. They have seven children.

AUGUSTA LEWIS TROUP.

Trough.—A receptacle for wetting down paper or for holding lye.

Trow, John Fowler, the most considerable printer New York has ever had, taking into view the magnitude of his office and the length of time it has continued, was born at Andover, Mass., in 1809, being descended from one of the best families in New England. In 1824, at the age of fourteen, he was apprenticed to the printing business with Flagg & Gould of Andover. Their office was esteemed as doing the best Oriental work in the country, and there the first printing was executed for the American Tract Society. Mr. Trow received during his apprenticeship thirty-five dollars a year, with twenty cents a thousand for all overwork over four thousand ems a day, thus sometimes earning four or five dollars a week, as he would begin at 2 or 3 o'clock in the morning. After he was free he began a weekly newspaper at Nashua, N. H.; but this experiment not answering he went to New York city, after being a few months at Andover. On May 1, 1833, he began business with John T. West, as West & Trow, at 144 Fulton street. There were two iron presses and a corresponding amount of type. In 1836 he dissolved his relation with Mr. West and continued alone at 36 Ann street till 1840, when he formed a partnership with Jonathan Leavitt as Leavitt & Trow, publishers and booksellers, and John F. Trow & Co., printers. This connection lasted till 1848. He introduced power-presses as soon as possible, the first being the Tufts press, turned by mule-power, and the second the Adams press. In 1840 he introduced a stereotype department. In 1855 a fire destroyed the buildings in which he then was, and he removed to the corner of White street and Broadway, afterwards going to Greene street. Mr. Trow was essentially a bold man, and never shrank from improvements because they might not eventually turn out well. In 1855 he introduced the typesetting-machine invented by William Mitchel, and continued its use for many years, thus being the first printing-house in the world in which type was regularly set by machinery. In 1847 he began publishing Wilson's Business Directory, and four years later the City Directory, both having since proved very profitable. During his first years in New York he imported fonts of Greek, Hebrew, Arabic, Syriac, Ethiopian, Coptic, Samaritan and other languages from Germany, and made a specialty of doing books in which these languages were used. Many very elaborate and voluminous works were executed by him, among others the first edition of Appleton's Cyclopædia. On the directory from eighty to a hundred and fifty men have been employed yearly, the book in years in which there has been competition being turned out in eleven or twelve days. When the Typothetæ was begun Mr. Trow was elected its first president, and when it was reorganized became its first vice-president. After the war, during Tweed's time, he was forced to sell out to the New York Printing Company, but took it back again after the downfall of the ring. The establishment was then at 207 East Twelfth street, where it still remains. Mr. Trow's death happened in August, 1886. He had then been fifty-five years an employing printer in New York, and sixty-two years in the trade. The business during his last year was known as Trow's Printing and Bookbinding Company.

JOHN F. TROW.

Tub-Sized Paper.—Paper which has received a coating of glutinous matter on the surface, by being passed through the size in the size-box while in process of manufacture. The better grades of writing-paper are also loft-dried—that is, dried by exposure to the air in the dry loft.

Tubo (Sp.).—Roller-mold.

Tucker, Henry James, a French printer and writer on technical subjects, was born at Alderminster, England, on June 2, 1840. He entered the printing business as an apprentice in March, 1857, at Birmingham. His employer became bankrupt, and after working for a while with another printer he conceived the idea of going to France, where he arrived on January 29, 1861, not knowing a word of French. He wrought in Paris as a compositor, with occasional trips to England, until 1867, when he began a newspaper for Americans. It was badly printed on French type, and he saw that it would be much more successful if better executed, and induced the printers to send for new type to Caslon, in London. Other publishers in Paris discovered that the journal looked well and placed their orders with Mr. Tucker, who soon did a good business in English type. He put in a stock just before the French and German war began. During that conflict he served as corporal in the Garde Nationale. One result of the war was that printing was declared free; any one was at liberty to enter upon it. Before there were only about eighty employing printers in Paris. This liberty occasioned the establishing of a number of new printing-offices, and Mr. Tucker was able to effect many sales. In 1873, upon the death of Henry William Caslon, he purchased the interest of the estate in this agency, and from that time it was his alone. It then occurred to him to start a monthly circular to advertise his business under the title of Typologie-Tucker, which he did under date of May 1, 1873. In its earlier numbers it received many letters and valuable articles from Madden and other typographical antiquaries, and it soon ceased to show in its editorial pages that its proprietor had any personal ends to serve. It was and is handsomely printed. In 1883 he resolved to print a dictionary of the technical terms used in a printing-office, and having for some time collected all of the material he could obtain, he published the first part in his journal in January, 1884. It is now ten years since that appeared, and the work is still in press, having reached the letter M. Nearly one-half is yet to be done. There was no prior French dictionary of typography except that of Momoro, which is a printer's manual arranged according to the order of the alphabet. It begins with Abaisser and concludes with Voleurs, and extends to about three hundred pages in small octavo. It was published in 1796. Mr. Tucker's is much larger, fuller and more recent, and includes lithography and copperplate printing. In September, 1887, the type-agency was sold back to Caslon & Co. for a life annuity, and since that time the conduct of the Typologie has been the sole business of Mr. Tucker.

Tumbler.—A general term for a printing-machine with a D cylinder—one that does not revolve, but reverses in its motion.

Turkey.—One of the chief countries in Eastern Europe, but also extending into Asia. The language is Turanian, largely affected by Persian and Arabic. The characters used in printing it are the same as those of the latter language, although Armenian is sometimes used. The chief city in which printing is carried on is Constantinople. No less than four hundred establishments in which letter-press and lithographic printing are carried on are situated in the capital of Turkey, while two hundred more are devoted exclusively to lithography. It is, however, asserted that not more than ten of the whole number are managed by competent persons. The work turned out is, consequently, of so inferior a description that the leading merchants, bankers and others have their printing done abroad. Constantinople boasts 38 dailies, 15 of which are printed in the Turkish language, 10 in Armenian, 8 in Greek and 5 in French. The earnings of compositors employed on the newspapers range from eleven to twenty-seven shillings a week.

Turned Commas.—These are used at the commencement of an extract or quoted matter: "thus."

Turned Sorts.—When a particular letter becomes scarce another letter is temporarily substituted for it, the face being at the bottom and the foot of the type appearing in the matter, as c■press for cypress.

Turning-Up.—The process of cutting the fore-edge of a book in such a manner as to throw the round out of the back until the edge is cut. All books that are cut in boards have a pair of trindles thrust between the boards and across the back to assist the operation.

Turnover.—A boy in England whose apprenticeship has ended with one employer, for some reason or other, and who is completing his time somewhere else. Bankruptcy ends an apprenticeship, and so does the death of a master. Boys are also known by this name, although incorrectly, who have worked at the trade without being indentured to it, and thus are capable of doing efficient service while under age at a reduced price. This word is not used in the United States, but is in Canada. It is derived from the idea that the boy turns over his apprenticeship to a new master.

Turnscrew.—A small flat piece of steel for fastening or unfastening the screws of composing-sticks.

Turpentine.—The spirit used for cleansing ink from wood-cuts, &c., after printing. It is an oleoresinous substance secreted by the wood or bark of a number of trees, nearly all coniferous. It is in a crude state, but is subjected to distillation, then being limpid and colorless, but with a peculiar and pungent smell. In England it is generally spoken of colloquially as "turps."

Turtle.—That section of the cylinder of a type-revolving press upon which a page or more of matter is locked up. It is curved in shape, and the column-rules are consequently thicker at the top than at the bottom, and the head rules are also curved.

Tuscan.—A fancy jobbing type.

Tweezers.—Small and finely pointed nippers used by compositors for correcting.

Twelvemo.—A sheet of paper folded into twelve leaves; written 12mo. It is also called duodecimo.

Twelvemo Chases.—Chases with two crossbars unequally divided.

Twelves.—A familiar term for duodecimo.

Twentymo.—A sheet folded into twenty leaves; written shortly 20mo. This occurs very infrequently, and is a sixteen with a four folded in.

Twenty-fourmo.—A sheet folded into twenty-four leaves; generally written 24mo.

Twicer.—A term of contempt for a man who professes to work both at case and press. In early days nearly all workmen were competent hands in both departments; now very few are proficient in both branches. In Germany those who are thus employed in the two parts are called Swiss swords, that weapon being sharp on both edges.

Two-Color Machines.—Machines adapted for printing in two colors at one operation.

Two-Column.—Matter arranged in double columns.

Two-Feeder Machines.—In England, machines adapted for two distinct layings-on. Two feeders are required on many American machines.

Two Fine-Line Rule.—In England, the rule called in America parallel.

Two-Line.—This expression is used in a double sense in printing-offices. A two-line letter is a Roman capital made on a body twice as large as usual, but covering nearly all its surface, as TWO. In each of the ordinary lines there is left a small space above the capital and a large space below. Thus a capital A has one twenty-fourth of its body above its top; it itself fills seventeen parts, and below it is six parts, five belonging to the descending letter and one being the shoulder. In a two-line letter one-half part is above and one-half part below, for the requisite shoulder, being one part each out of forty-eight. The capital takes forty-one parts, and there are five parts blank belonging to the descending letter. The bottom of a two-line letter should be even with the bottom of a word like "hand" in the lower line, and its top should be even with the top of capitals in the first line. In appearance, a two-line letter is a capital of Roman, of as great a relative width and having its thick and thin lines in proportion to those in the smaller letter. Two-line letter is much used for beginning advertisements and for title-pages. It is also obtained in condensed shape. No other type than two-line, capitals, small capitals and black letter is allowable on the title-page of a book of the highest class.

Two-line is also used for the absolute magnitude of a type. It is, however, preferable to employ the term "double" when this is intended. Double diamond is bourgeois; double pearl, long primer; double agate, small pica; double nonpareil, pica; double minion, English; double brevier, Columbian; double bourgeois, great primer; and double long primer, paragon. Double small pica, double pica, double English, double Columbian, double great primer and double paragon explain themselves. Four-line small pica and four-line pica are the next sizes larger. The face of two-line is considerably larger than that of a Roman of the same magnitude. Thus, double small pica has a face no larger than two-line bourgeois. It should be noted that in England several of the sizes known as double are not in reality so. Double pica is really a double small pica, and a slightly larger body is entitled real double pica. Three-line diamond is between a pica and an English; three-line pearl is a Columbian; three-line agate is between great primer and paragon; three-line nonpareil is paragon; three-line brevier is double small pica; three-line bourgeois is a little larger than double pica; three-line long primer is a little larger than double English; three-line small pica is double Columbian; three-line pica is a little larger than double great primer, and three-line English is four-line small pica. These sizes are Hansard's. On the point system three-line diamond is English; three-line pearl is a little larger than English; three-line agate is a great primer; three-line nonpareil is eighteen point; three-line minion is a large paragon; three-line brevier, double pica; three-line bourgeois, a pica and an English; three-line long primer, a double Columbian, and three-line small pica, a Columbian and a great primer.

Two-Third Case.—A case two-thirds of the ordinary length, designed to fit a cabinet or a particular rack of that width.

Twynn, John.—A printer in England who was convicted of treason and executed in 1663. He had published a seditious work, or one so called, and was sentenced to be hung, drawn and quartered.

Tympan.—In a hand-press, the thin wooden frame across which is stretched cloth or parchment and upon which the sheet is laid that is about to be printed. In the wooden hand-press this was thirty-one inches long and twenty-four inches wide. It consisted of two parts, an outer and an inner tympan. The outer tympan was made on two sides, and one end of beech and the other end of iron. This hinged upon the bed, and at its upper end another joint held the frisket. The inner tympan was a frame made to fit just inside the other tympan, to which it was secured by hooks fixed on the outer tympan and eyes on the inner.

Tympan Covers.—These necessary parts of a hand-press were formerly made of parchment or vellum, and are now to some extent. Other materials are more generally used. The skins are put on either wet or dry; if dry, they should afterwards be well wet, which makes them give for the moment. They are then drawn as tight as possible. As they dry they contract and are by this means rendered much tighter than they would be if put on wet.

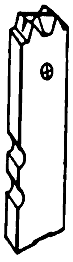
Type.—A character used in printing. It is usually upon metal, nearly an inch high and rectangular in shape. Ordinarily only one letter is upon a single stalk or stem, the character upon the end showing in a reversed form the letter as it appears in print. At the beginning of typography each printer found it necessary to cast his own type. If a new character occurred he had to engrave a new punch. If a deficiency arose in any sort work had to be stopped until new ones could be cast. If type metal was not convenient those sorts which were overabundant were thrown into the melting-pot. Within a hundred years, however, type was generally cast in some other place than a printing-office, unless that was very large. Moxon, in his Mechanick Exercises, in 1686, tells how the trade was then subdivided. Until lately type-founding was conducted much as it was two hundred years ago.

Type varies in size up and down, widthwise and in height to paper. It does not agree in many fonts as to lining and is of many fashions. Until within a few years there was a discrepancy as to height between Boston and New York foundries. There is a similar variation between two parts of the printing-office of the University Press in Oxford, England, and between different countries still more. The Russian type shown on page 497 of this Dictionary is a nonpareil higher than the American standard, which is ninety-two one-hundredths of an inch. Many founders purposely made their types so that they would not agree with those from other foundries, thus making it necessary for all who possessed type originally cast by them to obtain their sorts and additions where they obtained the original letter.

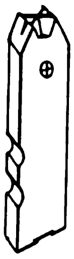
The irregularity of this composition is caused by the types of the letters a and e, which are larger than the other letters, by accurate measurement, less than nine one-thousandths of an American inch. This minute difference is repeated and increased in every line, until the connection between words and lines is partially destroyed. If this use of the large a and e were continued through a dozen additional lines, the reader would be unable to understand what has been composed.

INJURY CAUSED BY IRREGULARITY OF BODY.

The various parts of a type are the face, the shoulder, the body, the nick, the pin-mark, the feet and the groove. The face is the only portion which is coated with ink, and the only part which shows on a printed page. It slopes down and outward from the lines until it reaches the shank of the type, thus giving them the proper support, and is always a little smaller each way than the body. Between the lines there are hollows, these being so contrived that the top shall not be crushed or broken down, but will be supported. In the last century and before that the inclination began low down on the stalk, and the type gradually became smaller above. When stereotyping began to be practiced in America the square part continued as far as possible, and the shoulder was as short as would answer the purpose, a little flat space being left at the top of the body, below the shoulder. The body is always rectangular in ordinary fonts, but occasionally in some fonts it inclines. In this case spaces are contrived to fit in at each end of the line, so that all may lift. The nicks are on the front, and most of them are lower down than the centre. They vary from one to four in number, but can be made by their permutations to note a great variety of types. They can be placed singly upon the body, in different positions or can be grouped. One nick above and two close together below are very different from three at equal distances. On the Thorne typesetting-machine there is a great variety of nicks, all being very shallow; upon the McMillan there are as great a number, but they are not shallow. On most typesetting-machines the type is nicked on the back, the font nick being at the front. This makes the type difficult for a hand compositor to set when occasion requires. The builders of the McMillan machine therefore determined to do without the font nick and mark the letters at their front. Some foreign types are nicked at the back, as, for example, those used in France. The feet are the two parts of the bottom of the letter. When type is cast a jet or piece of metal adheres to each letter and is afterwards broken off. Then the types are planed and grooved at the bottom. The pin-mark is from the projection of a piece of the mold. The groove is between the feet.



TYPE AS NOW MADE.



TYPE OF THE LAST CENTURY.

The goodness of a type is judged by the harmony and justness of its proportions, the evenness of its lining and the openness of its counters or hollow spaces. The latter is essential to working well, as those in which the counters are small are liable to become filled with ink. Very fine lines are likely to break and crumble, and should be supported against those which are heavier. The top of the letters of a similar shape in the same font should be even with each other, and their bottoms should also line. For harmony and beauty no rule can be given. The width of a type cannot be exactly estimated, as each of the characters in each font varies somewhat from the others. The original punch of a letter may be one-ninetieth or one-ninety-first part of an inch in width. Whether it shall be the former or the latter depends upon the individual equation of the cutter. He has some general rules, but they will not cover this point. An impression must be driven from this into a matrix, and that again must be fitted up. Whether this space shall be wide or thin depends again upon the workman. He might make the interval at either side one five-hundredth or one four-hundredth of an inch, or less or more. As a result ten a's from one foundry might be of the same width as nine g's in one face, but in another one ten g's would equal nine a's. From the point of view of the printer g ought to be of the same thickness as n, but it very frequently is larger and very frequently smaller. In a rough measurement of a small pica made by A. D. Farmer & Son m was twice as thick as r or f; half again as wide as u, y or b, and nearly three times as wide as i. Lower case l was a little thicker than i, o than c, n than u, b than v, and g than a. Most printers would assert that d, b, p, q, h, g, n, u, k and y are of the same size. This is not true in this font; fourteen n's would occupy the same space as fifteen g's. In this font e is thicker than a, f than s and c than o. Commonly the thickness is from the largest to the smallest, as follows, beginning with m: m, w, p, k, h, d, n, u, y, b, q, g, x, v, z, a, o, c, e, s, r, t, f, j, l, i. Three faces were carefully measured for this work,

WIDTH OF LETTERS.

	Bruce.	Farmer.	MacKellar.
a	51½	59½	62
b	56	63	67½
c	47½	56	58½
d	59	67	72
e	47½	54½	59
f	32	46½	41
g	59	66½	71
h	61	69½	72
i	30½	36	37
j	30	..	36½
k	66	69½	75
l	32½	36	39
m	86½	108½	106½
n	59	70	72½
o	52	58½	65½
p	58	65½	71½
q	55	64	70
r	45	49½	58½
s	43½	47	50½
t	36	44	46
u	59	69½	71
v	59	66½	71½
w	84	97	98
x	67	70½	73½
y	61	67½	73
z	48	55½	58½
æ	..	88	87
œ	..	97	99
fi	59½	71	74
ff	62	81	79
fl	60	72	74
ffi	85	107	111
ffl	86	106	108

viz.: Bruce's brevier No. 16, MacKellar's brevier No. 16, and Farmer's brevier No. 20. They do not follow the order given above, nor any other. The absolute size of each letter, in thousandths of an inch, is as shown on the preceding page. The relative thickness is as follows, m being taken as the standard, or 20:

RELATIVE THICKNESS OF LETTERS.

	Bruce.	Farmer.	MacKellar.
a	12	11½	12
b	13	12	13
c	11	11	11
d	14	13	13½
e	11	10½	11
f	7½	9	8
g	14	13	13½
h	14	13½	13½
i	7	7	7
j	7	7	7
k	15½	13½	14
l	7½	7	7
m	20	20	20
n	14	13½	12½
o	12	11½	12½
p	13	12½	13½
q	13	12½	13
r	10½	9½	10
s	10	9	9
t	8	8½	9
u	14	13½	13½
v	14	13	13½
w	19½	19	18½
x	15½	13½	14
y	14	13	14
z	11	11	10
æ	..	17	16½
œ	..	19	19
fi	14	14	14
ff	14½	16	15
fl	14	14	14
ffi	20	21	21
ffl	20	20½	20½

In the order of the alphabet it is:

Bruce—1, m; 2, ffl; 3, ffi; 4, w; | 5, œ; 6, æ; 7, k; 8, x; 9, ff; "10, y; 11, h;" 12, fl; 13, fi; "14, v; 15, n; 16, g; 17, d; 18, u;" | 19, p; 20, b; 21, q; 22, o; 23, a; 24, z; "25, e; 26, c;" 27, r; | 28, s; 29, t; 30, l; 31, f; 32, i; 33, j.

Farmer—1, ffl; 2, ffi; 3, m; "4, w; 5, œ;" 6, æ; | 7, ff; 8, fl; 9, fi; 10, x; 11, n; | "12, k; 13, u; 14, h;" 15, y; 16, d; "17, v; 18, g;" 19, p; 20, q; 21, b; 22, a; 23, o; 24, c; 25, z; 26, e; | 27, r; 28, s; 29, f; 30, t; "31, j; 32, i; 33, l."

MacKellar—1, ffi; 2, ffl; 3, m; 4, œ; 5, w; 6, æ; | 7, ff; 8, k; "9, fi; 10, fl:" 11, x; 12, y; 13, n; "14, h; 15, d;" "16, v; 17, p;" "18, g; 19, u;" 20, q; 21, b; | 22, o; 23, a; 24, e; 25, c; | "26, r; 27, z;" 28, s; 29, t; 30, f; 31, l; 32, i; 33, j.

The upright marks indicate the proportion of thickness of each letter. The difference between the thinnest letter and the letter m is divided into four parts. This difference is a q in Bruce's and MacKellar's, and a d in Farmer's. That is, a q added to a j in the former and an l added to a d in the latter, will exactly equal an m. Divide this q or d into four parts and each will represent an addition to the thickness of the l or j. The letters between quotation-marks are of exactly the same thickness. It will be seen from these examples that there is no rule for the width of any character, but that all are governed by chance. The m bears no fixed relation to w, to c, to a or to d, or indeed to any other character.

That it may be seen that this irregularity does not exist, because different foundries have different standards, a measurement is given of another brevier from A. D. Farmer & Son. It is their No. 12. It is a little thinner than the other, but not uniformly so. Similar discrepancies can be noticed between various fonts from MacKellar and Bruce's foundries, or in fact from any foundry in the United States.

The measurements are as follows: a, 35; b, 62; c, 53; d, 64; e, 50; f, 46; g, 62; h, 68; i, 34; j, 40; k, 68; l, 85; m, 98; n, 64; o, 57; p, 65; q, 64; r, 46; s, 44; t, 40; u, 66; v, 62; w, 90; x, 64; y, 65; z, 53; fi, 66: fl, 66; ff, 77; ffi, 97; ffl, 99. In this table the No. 12 is smaller than the other by 4½ thousandths in a; 1 in b; 3 in c; 8 in d; 4½ in e; ½ in f; 4½ in g; 1½ in h; 2 in i; 1½ in k; 1 in l; 5½ in m; 6 in n; 1½ in o; ½ in p; 3½ in r; 8 in s; 4 in t; 8½ in u; 4½ in v; 7 in w; 5½ in x; 2½ in y; 2½ in z; 5 in fi; 4 in ff; 6 in fl; 10 in ffi, and 7 in ffl. The letter q is of the same thickness in each.

The regular sizes of type are twenty-one, as follows:

1. Diamond.
2. Pearl.
3. Agate.
4. Nonpareil.
5. Minion.
6. Brevier.
7. Bourgeois.
8. Long Primer.
9. Small Pica.
10. Pica.
11. English.
12. Columbian.
13. Great Primer.
14. Paragon.
15. Double Small Pica.
16. Double English.
17. Double Columbian.
18. Double Great Primer.
19. Double Paragon.
20. Meridian.
21. Canon.

Besides these there is minionette, between minion and nonpareil. Brilliant is a size still smaller than diamond. Type has been cast in Paris as minute as half nonpareil. Piece-fractions are provided on such a body. Music type is made of this size, and is then entitled excelsior. Larger than canon is four-line, and above this the magnitudes increase by picas, as five-line pica, ten-line pica, or thirty-line pica. Above twelve-line pica metal is rarely used, the characters being in wood. In this material they descend to two-line pica. See WOOD-TYPE.

Wood-type have been made as large as four feet high, and in fact they are limited only by the size of the press on which they are printed from. Below are the common names of type, from great primer down, with the explanations which Hansard has given of their origin and their meaning, the text being borrowed from him, and the type set in the sizes described. The names have been changed to correspond to American usage and Columbian and brilliant added:

Great primer is called Tertia in Germany, and is, therefore, one of the major sizes of letter which, in the infancy of the art, served for printing several works of consideration, and particularly the Bible; on which account it is by some called Bible text.

Columbian has come up in recent times. It is said that Barlow's Columbiad, printed in 1807, employed this type; but its regular use is due to George Bruce, who in 1822 found it necessary to interca-

late this size between great primer and English. It has been very little employed. Even double brevier display type is little required.

English is called Mittel by the Germans, and St. Augustine by the French and Dutch; both of which names might be productive of considerable argument. The word mittel, bearing the same meaning with middle, tells us that the former sizes of letter were seven in number, of which English was the centre, having prima, secunda, and tertia on one side, and pica, long primer, and brevier on the other. As to the name of St. Augustine, which the French and Dutch give it, it leads us to suppose that the writings of that father were the first work which was done in letter of that size.

Pica is another letter that admits of having particular notice taken of it, on account of its being called Cicéro by the French and Germans; for as the preceding size was distinguished by the name of St. Augustine, so has this been honored with that of Cicero, on account of the Epistles of that writer having been first done in letter of this size, in which we are not left to mere conjecture, but have tradition on our side; for in the year 1704 it was asserted by a compositor, then upward of seventy years of age, whose authority, though allowed to rest on hearsay evidence, deserves notice, when we consider the early period the assertion was made, and that no contradiction has prevented its belief, as well as the probable reason why fonts should be named after the works for which they were first used. Therefore we have only to trace this relation two or three lives back, and we shall be brought to the time when it was considered an undoubted fact. This point ascertained, why the pica body acquired the name of Cicero, it may open a fair field for conjecture on most of the other disputed bodies, and may enable those who feel interested in the controversy to decide whether the Germans or the French were the first who dedicated the letter of this body to the name of Cicero on the before-mentioned account.

Small pica is thus named from its inferiority to pica; but in France they assign the invention of this body of letter to Philosophie; for which, indeed, they may have their reason, considering that their Cicéro and Philosophie are of one and the same face; from which we conclude that small pica has not been thought there worth cutting with a face proportionable to its body, and that the cramping of Cicéro to Philosophie was done with no other view than to get in upon the former. This we venture to suggest, though we can form no ideas why the Germans give this letter the name of brevier.

Long Primer.—Upon the same supposition, that some bodies of letter took their names from works on which they were first employed, we are induced to believe that the Germans gave the name of Corpus to this character, on account of their Corpus Juris being first done in this size, as it is still continued in that letter; but whether Garmond is the name of the author, or what signification else it bears, we have no items of. In contradistinction to the French Gros Romain they called this sized letter Petit Romain, conformable to the distinction that is made between great primer and long primer in England.

Bourgeois, by its name, seems to have first come from France. Gaillarde is a letter of the same body, but has the face of Petit Romain. Two bourgeoises are equal to a great primer.

Brevier had its name from being first used for the breviaries, or Roman Catholic church books, which are commonly printed in this character. It is also called Petit and Jungfer (or maiden letter) by the Germans, on account of its comeliness.

Minion is a body one-half the size of English, chiefly in use for newspapers, seldom for bookwork. Since Mr. Hansard wrote minion has been much employed for large dictionaries and encyclopædias, as it is the smallest legible type.

Nonpareil.—At the introduction of this type it was, of course, without a peer in comparative size to the larger types and still retains its character; for every smaller type is below the compass that any eye of medium sight is able to read without pain. Its body is exactly half pica. The emulation to obtain much matter in small compass has induced the cutting of two or three grades smaller, the beauty and value of which may have produced their denominations.

Agate in America, or ruby in England (half small pica), was, in fact, originally a nonpareil with short ascenders and descenders, cast on a smaller body, or sometimes a pearl, on a larger, to look open; but now some founders have a distinct specimen for this size. This name of ruby has but very lately been adopted in the type-founders' specimens; but some years ago it was found by the writer of this [Thomas Curson Hansard] absolutely necessary to give some distinguishing appellation to this size, as the letter-founders had given him one-nick pearls of two bodies. One was half small pica, and another was half long primer; the mistakes arising from this circumstance in a house much in the habit of using small type, occasioned the expedient of inventing a new name, and as the neighbouring sizes were called pearl and diamond, it seemed not very inapplicable to take the name of ruby. In America it has always been known as agate.

Pearl was the size cut next to nonpareil. Its regular body is half long primer. Although it has been sometimes superseded by ruby (agate), before mentioned, yet for pocket dictionaries, pocket Bibles, prayer-books, &c., and for those who have strong sight its use is admirable.

Diamond.—As new inventions are usually carried to extremes, so type-cutting has been carried to a degree of eye-straining minuteness that very nearly approaches to astonishment in those who are at all acquainted with the various processes which each separate type has to pass through before its impression gets upon paper. In the type now trying the reader's eye so minute is each separate character which has to be cut upon a steel punch, struck into a matrix, cast in a mold, rubbed and dressed by the founder, lifted into his stick and justified with thousands of others into a page by the compositor, that, of the lower-case i about 2,800 go to a single pound, and the thinnest space about 5,000! Dictionaries, Bibles, prayers-books are now not merely pocket size, but may be hid in a glove, or lost in a lady's reticule. The body is half a bourgeois, and was thought, at one time, to be the ne plus ultra of small type, but Mr. Henri Didot's smallest type is less than the English diamond, being half of a nonpareil. Mr. Bessemer who cut the Caslon diamond, was engaged in 1825 upon a smaller font, to rival Didot's. The Dutch are believed to have been the first to cut and cast diamond in Europe, and Mr. Fry the first in England.

Brilliant, in which this character is composed, is the smallest type which has been cast either in England or America. It is a half brevier or half minion, these two sizes coming very close together. This type was cast in Scotland. It will contain, in the ordinary stick set to thirteen and a half ems pica, thirteen hundred ems. The ordinary law page would contain over five thousand ems.

All of the work done by early printers was on large type. Many mechanical difficulties were thus overcome, especially that of the squaring of the mold. But about the beginning of the sixteenth century the small sizes began to appear. Canon, prima, double pica or secunda, great primer or tertia, English, pica and long primer were among the first additions. In 1598 pica, English, long primer and brevier were mentioned as existing in England, and in 1635 nonpareil and two-line letters were spoken of. Moxon, in 1683, mentioned all of those enumerated, as well as pearl and small pica, the latter of which he "accounts it no great discretion in a master-printer to provide for." Before 1750 minion, bourgeois, small pica, paragon, two-line pica, two-line great primer and two-line double pica were added. Other types cut later were Trafalgar, emerald (American minionette), ruby (American agate) and diamond. In 1824 Didot made a half nonpareil, and since 1850 a half brevier has been cast. In America the great primer of two hundred years ago, which was a double brevier, is called Columbian, great primer itself being a double bourgeois; paragon has gone out of use in England; double pica has been divided into two sizes in England, these being denominated double pica and two-line pica, but here double small pica and double pica; double Columbian and double paragon are to be found, as well as meridian, which is four lines of small pica. French canon is here called canon simply. Above these, type are denominated five, six, eight or as many lines of pica as may be needful. Since the introduction of the point system three-line nonpareil and five-line nonpareil have come into use, the former being a little larger than great primer and the latter about double Columbian. There are several minute sizes of MUSIC TYPE (which see). In the United States Columbian, agate and meridian date from 1822.

SIDE VIEW OF CANON BODY.

SMALL PICA BODY.

AGATE BODY.

DIAMOND BODY.

VIEW OF BODY INCLINED TO SHOW FACE.

Many of the explanations given of the names of types which have appeared in Moxon, Smith, Stower and Hansard do not appear to stand examination. Why one is called great primer and another long primer it is impossible to tell. English was thus named on account of England, and Columbian in memory of the discoverer. Small pica is a diminutive of pica. Paragon (a pattern), minion (a darling), and nonpareil (none such) have an obvious derivation, as have those which derive their names from gems, as brilliant, pearl, agate, diamond and ruby. Bourgeois comes from the city of Bourges, and not from bourgeois—a citizen.

From Talbot Baines Reed's interesting work on the History of British Type-Founding we copy on the next page the following table giving the names of the types in six languages. In some particulars it varies from those stated elsewhere in this book, and the names employed in English are British names.

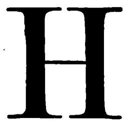
The relation of sizes in types has often been compared with the musical scale. Like that, it has half degrees, and it is of the unequal temperament. Beginning at the bottom of the scale. there is a whole note, then three ascending by half notes, then a whole note, then a half note and finally a whole note, which doubles the magnitude, as the octave doubles the number of vibrations of a string. The point system rises by equal intervals.

The number of sorts originally cast were few. In the first Roman cut by Jenson there were only seventy-three sorts. Twenty-three of these were capitals, J, U and W not then being in use. The lower-case alphabet is the same, except that the u is substituted for the v, and in addition there are the long ſ and the diphthongs æ and œ. There are fifteen contractions, six double letters and three points—a period, a colon and an interrogation. Other characters were slowly added. Italic began to be used in 1501, and was introduced into England in 1524. In Moxon's case of 1683 there is no Œ, ‡, ‖, ¶, [, (, !, nor are there any small capitals. The number of sorts now in a complete font is very great. There are the Roman capitals, small capitals, lower case, points, figures and accented letters, and the same in Italic, besides reference marks used by both.

Types are divided into three classes—ascending, descending and small letters. The ascending letters are those which rise to the top of the body, like all of the capitals, and b, d, f, h, i, k, l, t, the last not reaching as high as the others; the descending letters comprise capital Q and g, j, p, q, y, and the small letters embrace a, c, e, m, n, o, r, s, u, v, w, x, z. The small letters are much more used than the other two kinds, the ascending letters come next and the descenders last. The descenders are sometimes so infrequent in actual composition that one will not occur in thirty or forty letters. The small letter is now generally so made that it occupies eleven-twentieths of the whole dimensions up and down. The ascending letters should rise four-twentieths above the top of the small letters, and the descending letters fall four-twentieths below the bottom of them. This would cause each of these two classes to occupy fifteen-twentieths of the whole body. As type-founding is now practiced, however, the faces of the small letters are often larger, being occasionally as large as five-ninths or even as four-sevenths. In the latter case the descenders are made very brief. The scale would then be about a twenty-eighth above and below each for bearing, four parts for the descender, six for the ascender and sixteen for the small letters.

Types are known as thick or fat when wide, and narrow, thin or lean when the reverse. They are more than height to paper when longer than usual, and less than height to paper when shorter than is customary. They are called one-nick, two-nick, and so on, to distinguish them from other types of the same body, and they are copperfaced or barefaced when copper has or has not been deposited by the galvanic process upon them. They are also distinguished as large face, medium face and small face.

New type has, or should have all of its fine lines complete. After being exposed to twenty or thirty thousand impressions its beauty has to a considerable extent departed; and after a hundred thousand impressions have been taken it is old type. It is supposed that under ordinary circumstances, care having been taken, a font may stand two hundred and fifty thousand impressions. On newspapers from twice to three times this number has been attained, but the last impressions were very poor, and it should be noted that the whole of a font never is on a press at the same time. An ordinary double medium newspaper, with two forms of two pages each, will only have three hundred and fifty pounds on the press at once, yet the font will certainly contain five hundred pounds, and may have three times that quantity. Good book offices usually employ their newest type in electrotyping. As soon as the bloom is taken off it is used for letterpress work.


AN IMPRESSION FROM TYPE.

Self-spacing type is type which is so made that every character is of a certain determinate width, being a fraction of a pica em. It is the invention of Linn B. Benton of Milwaukee. He claims that it enables all matter to be justified more quickly than it can be done by the old system, and that in correcting one letter can be substituted for another with much less difficulty. In nonpareil the hair spaces are a sixth of an em; spaces and f, i, j and l are upon a third of an em; the en takes a quadrat and twenty-two other letters; the double-thick space that size of space and sixty-one other letters; five-sixths of an em, twenty-four letters; an em, twenty-two letters; W, Æ and Œ are upon bodies seven points wide; and the two-em dash, two-em quadrat and right and left hand fists upon two-em bodies. In all, Roman and Italic, there are two hundred and thirty-two characters, each of which is two, three, four, five, six, seven or twelve times the thickness of the hair space, or point space. When the stick is set it is set to so many units, or ems and units; consequently there never should be any difficulty, such as a good compositor often experiences in other type, in getting a line exactly justified, it being perhaps too loose for a thick space in one place and too tight for an en quadrat. The objections to this plan are that dirt increases the size of all types and abrasion lessens it. Were the stick to be set exactly to a certain number of units at the beginning of a year, it is not certain that it would contain just the same number at the end. It might be more and it might be less. A more serious objection is that certain letters must be cramped to enter certain sizes and that others must be spread out unduly in order to fill other widths. In the nonpareil the c, e, r, s and t are made of the thickness of an en, because the next size smaller is too small, and in the four-unit letters several are included which should be on a smaller body to match a perfect face. This distortion of the characters is seemingly necessary when all lower-case letters are upon five bodies. As appears from the preceding tables, there are about twelve sizes to lower-case letters. To reduce them to five, or even to eight, would necessitate much compression of some and expansion of others. Could this be done and the beauty and characteristic features of each letter be preserved? See on this subject generally SIZES OF TYPE, STANDARDS OF TYPE and TYPE-FOUNDING.

THE BODY OF A TYPE.

APPEARANCE OF A TYPE.

NAMES OF TYPES IN VARIOUS COUNTRIES.

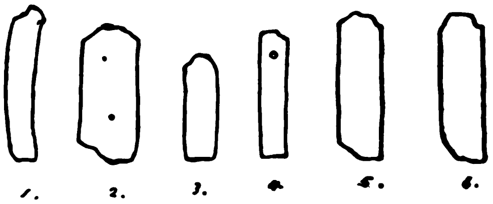
English.	French.	German.	Dutch.	Italian.	Spanish.
French Canon	Double Canon	Kleine Missal	Parys Kanon	Reale	———
Four-line Small Pica	Gros Canon	Grobe Canon	Groote Kanon	Corale	Canon Grande.
Double Great Primer	Trismegiste	Kleine Canon	Kanon	Canone	Canon.
Double English	Petit Canon	Doppel Mittel	Dubbelde Augustyn	Sopracanoncino	Peticanon.
Double Pica	Palestine	Roman	Dubbelde Mediaan	Canoncino	———
Double Small Pica	Gros Parangon	Text or Secunda	Dubbelde Descendiaan (or Ascendonica).	Ascendonica	Misal.
Paragon	Petit Parangon	Parangon	Parangon	Parangone	Parangona.
Great Primer	Gros Romain	Tertia	Text	Testo	Texto.
Columbian	Gros Texte	Grobe Mittel		Soprasilvio	———
English	St. Augustin	Kleine Mittel	Augustyn	Silvio	Atanasia.
Pica	Cicéro	Cicero	Mediaan	Lettura	Lectura.
Small Pica	Philosophie	Brevier	Descendiaan	(Filosofia)	———
Long Primer	Petit Romain	Corpus or Garmond	Garmond	Garamone	Entredos.
Bourgeois	Gaillarde	(Borgis)	Burgeois or Galjart	Garamoncino	———
Brevier	Petit Texte	Petit or Jungfer	Brevier	Testino	Breviario.
Minion	Mignonne	Colonel	Colonel	Mignona	Glosilla.
Nonpareil	Nonpareille	Nonpareille	Nonparel	Nompariglia	Nomparell.
Pearl	Parisienne or Sodan Perle	Perl	Joly Peerl	Parmigianina	———
Diamond	Diamant	Diamant	Robijn Diamand	———	———

Type-Cases.—The receptacles into which type is laid for composing. See CASE.

Type-Founding.—The art of casting type. The principle involved is the same as in a bullet mold. A hollow is filled with melted metal and the mold, which is in several pieces, is then opened and the bullet or type drops out, having been solidified in a very brief space of time. The shape of the product is of course different, and the type has upon its end a character in relief, to which ink and paper are afterwards applied. The mold, too, is much more exact. The first founders had no common standard of height, thickness or other magnitude, and consequently the shape of the letters cut and cast by them differed very widely. It is easy in an old book to identify the type there used as having been employed in another book, and to state in what printing-office the work was prepared. To some extent the productions of two of the present foundries can still be told apart from all others, as there are differences which serve to mark them. The printers of the cradle age generally cast their own type and made their own punches. The latter were probably of brass or copper, and the matrices of lead. In the Enschedé foundry, in Haarlem, are leaden matrices, said to be derived from punches of copper. They are now over four hundred years old. The metal cast into them only touched them at the end of each type and was chilled as soon as it touched the leaden plate, leaving this intact. They were also obliged to make their own ink and construct their own presses. Type-founding seems to have been the first of the typographic processes which separated from the others and was carried on as a separate trade. Prior to this a printer was obliged to cut his own punches, fit up his matrices and do his own casting. It is true the number of characters employed with a certain size was small, not much exceeding one hundred; the type was large, thus obviating the necessity of so great an accuracy as was afterwards requisite, and few faces were necessary. Many printing-offices of the sixteenth century had only four or five sizes of type. The quantity required was also small. Enough for two quarto pages would do, if there were no more, and three or four cases full of type were amply sufficient. A printer could sometimes buy the stock of another who was declining business; he might induce a friend in another town to cast letter for him, and he could take some comparatively new characters of an old font, touch them up with a graver and employ them as punches for a new casting. Caxton did this. Some of the irregularity of old faces can thus be accounted for, as the letters, after being touched up, would give a duplicate, although slightly different from the original characters. It is apparent that there must have been perfect quadrature of the bodies from the first. The types do not lean either backward or forward.

Type-founding in Great Britain, from which America derived her art, was practiced by Caxton, Wynkyn de Worde and by nearly all of their successors for nearly two centuries. These men were essentially printers, and type-founding was entered into only incidentally, as there was no other way to obtain letter. These first faces were in black-letter. Pynson introduced Roman in 1518. The next year Wynkyn de Worde cut some Greek letters in wood, and in 1524 cast some in movable types. After 1520 many English books were printed in Roman, which began to gain the ascendancy after about 1580. The printers and letter-founders added foreign and dead languages from time to time, but no mention of a type-founder, as such, occurs until 1597, when the Stationers' Company ordered Richard Sympson, letter-founder, not to cast any characters without giving notice to the company. In 1637 the Star Chamber decreed that John Grismand, Thomas Wright, Arthur Nichols and Alexander Fifield alone should possess the right of casting, except at the Universities. Oxford had a foundry at about this time. Joseph Moxon began in 1659, and several years later wrote a book, in which he explained the methods of type-founders and printers. Other founders succeeded him, but none possessed the secret of beauty, nor were their types to be compared with those manufactured on the Continent. All of these minor foundries were acquired in the course of time by Thomas and John James, the former of whom began business in 1710 and died in 1736. He was succeeded by his son, John James, who continued until 1772. In this foundry, towards its end, were consolidated fifteen other foundries. With the death of the younger James in the year last mentioned the business practically came to an end.

Type varied in height at the beginning from three-quarters of an inch to an inch and a half. It had no nick and its face had a long shoulder below. Some type cast in the fifteenth century was lately taken from the bed of the Saône in France and is herewith shown. It perfectly agrees with a thin letter found in a book printed in Germany which was smashed upon the top of a page and remained there imbedded. An impression taken from the form while this condition lasted is still preserved and gives its witness as to the shape of letters four hundred years ago.



6 Profile Drawings from M. Claudin's Types October 1883

English type-founding began to be better executed in 1720. In that year William Caslon, who had been an engraver of gun locks and barrels, was induced by John Watts, an excellent printer, to embark in letter-cutting. His success was remarkable. By 1730 he had eclipsed most of his competitors. None of his successors, in England or America, have surpassed him and his family. Their types were truly proportioned, harmonized well with each other and worked well on press. After Caslon was known English printing-offices ceased to purchase type in Holland, which they had before been obliged to do. His son, William Caslon, joined the foundry in 1722, and William Caslon the third, grandson of the original founder, took charge in 1778. The foundry under all three did most excellent work. Other founders of eminence were Baskerville, Wilson, Cottrell, the Frys, Jackson, Martin and Figgins. The high reputation which English founders had secured was preserved by them. William Miller, who began in 1809 in Edinburgh, and later associated with himself a partner under the style of Miller & Richard, soon established a high reputation. At present their foundry is the largest in the English-speaking world. British foundries are distinguished by the number of Oriental and other foreign types which are cast. In comparison with American establishments they have very few fancy faces, nor do they make so constant an effort to supply novelties.

American type-founding began in 1768 in Boston. A printer named Mitchelson, from Scotland, attempted to set up a foundry there, but did not succeed. Abel Buel of Killingworth, Conn., who was a skillful jeweler and goldsmith, began a foundry without any other aid than his own ingenuity. This was in 1769. In the course of a few years he completed several fonts of long primer, which were made use of. The war stopped his work. The first regular foundry was established at Germantown, Pa., in 1772, by Christopher Sauer, the second of that name. The implements were imported from Germany. Sauer's object was to cast enough pica types for a quarto edition of a German Bible, and to have enough material to keep the whole work standing. He was succeeded by Justus Fox, one of his workmen and a very ingenious man. This foundry was sold after Fox's death, and was removed to Baltimore, where it was continued as late as 1817. Another foundry was begun in Germantown in 1773 or 1774 by Jacob Bay, a natural mechanic of great skill. He continued in type-making in Germantown until 1789, when he removed his foundry to another part of Philadelphia. It was finally sold to Francis Bailey, a printer, who continued the making of types, but used them himself. Dr. Franklin placed his grandson, Benjamin Franklin Bache, for a time in a type-foundry in Paris so that he might learn the art. At the close of the Revolutionary War he purchased of P. S. Fournier the materials of an old foundry, and Bache began business with it in Philadelphia. This enterprise was not successful, and Bache afterwards became a printer and publisher. John Baine, a type-founder of Edinburgh, sent his grandson to Philadelphia in 1785, and after 1787 went there himself. They were good workmen and had full employment. John Baine died in 1790, and his grandson relinquished the business soon after. The first foundry in New York was that of Adam Gérard Mappa of Amsterdam, in Holland, who was a letter-founder there, having succeeded Voskens & Clerk. The year when he came to America is not exactly known, but he was in business in New York in 1792. He entered the employment of Binny & Ronaldson when they established their foundry at Philadelphia in 1796, but subsequently became employed by the Holland Land Company in the State of New York.

PRICES OF TYPE IN AMERICA IN THE YEARS GIVEN.

NAME.	1801.	1806.	1811.	1819.	1827.	1831.	1841.	1850.	1866.	1872.	1885.	1888.	1898.
Pica	$0.35	$0.44	$0.55	$0.44	$0.42	$0.36	$0.38	$0.30	$0.56	$0.52	$0.38	$0.42	$0.30
Small Pica	.40	.48	.58	.48	.46	.38	.40	.32	.58	.54	.40	.44	.31
Long Primer	.47	.56	.66	.56	.50	.40	.42	.34	.62	.56	.42	.46	.32
Bourgeois	.56	.66	.76	.66	.58	.46	.46	.37	.66	.60	.44	.48	.34
Brevier	.67	.76	.86	.76	.70	.56	.54	.42	.70	.64	.48	.52	.37
Minion	....	1.03	1.13	1.00	.88	.70	.66	.48	.76	68	.52	.56	.40
Nonpareil	1.12	1.40	1.75	1.40	1.20	.90	.84	.58	.84	.76	.58	.64	.45
Agate	....	....	....	....	1.44	1.10	1.08	.72	1.00	.90	.68	.74	.52
Pearl	....	....	....	....	1.75	1.40	1.40	1.08	1.40	1.40	1.08	1.20	....
Diamond	....	....	....	....	....	....	....	1.60	1.80	1.80	1.50	1.60	....

The first foundry which lasted for many years was that just mentioned. The owners were Archibald Binny and James Ronaldson. They acquired in a short time what was left of the various foundries of Baine, Bay, Franklin and Mappa, and by diligence soon amassed a fortune. They had no competitors. The pica upon Fournier's basis was adopted by them, they having come into possession of it through the favor of Duane. This is the pica which forms the foundation of the American point system. In 1804 Elihu White began making type in Hartford, in 1810 removing to New York. D. & G. Bruce, two Scotch printers of New York, in 1813 began stereotyping. Neither Binny & Ronaldson nor White would sell them type with square shoulders, which was necessary for the new art, as they believed that stereotyping would diminish the demand for type, and the Bruces were forced to begin letter-casting, so that they might have the proper type to use. So successful were they that in 1816 they disposed of their printing-office, and not long after of their stereotyping outfit. The three establishments thus begun are still in existence. Binny & Ronaldson were succeeded by Richard Ronaldson, and he was followed in 1833 by Lawrence Johnson and George F. Smith. Mr. Smith retired before 1845, when Mr. Johnson associated with himself Thomas MacKellar, John F. Smith and Richard Smith. Other partners have since been admitted. The firm name, which had been L. Johnson & Co., changed on the death of the head in 1860 to MacKellar, Smiths & Jordan, and later it was incorporated. It has now been swallowed up by the American Type-Founders' Association. Elihu White took his brother into partnership, but after the death of the principal in 1836 the business was conducted under various titles until about 1859, when it became Farmer, Little & Co. Andrew Little and John Bentley retired two years ago, and the firm became A. D. Farmer & Son, Aaron D. Farmer and William W. Farmer, with several heads of departments, forming the new company. The firm of D. & G. Bruce was dissolved in 1822, when David Bruce retired to a farm in New Jersey. His brother, George, then devised the uniform progression of type sizes so long cast by that foundry, and with various partners continued the business up to the time of his death in 1866. His partners, however, were really so only in name, as in force of character and in money invested his was the predominant weight. He was succeeded by his son, David Wolfe Bruce. James Conner was a successful founder of New York, his business since his death having been carried on by his children and grandchildren.

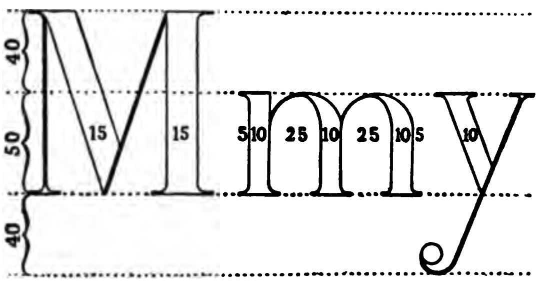
The Boston foundries were the Boston Type Foundry, lately owned by Schraubstädter & St. John, and the Dickinson Type Foundry. The former began in 1816 and the latter in 1839. Both are now parts of the American Type-Founders Association. Elihu White began a foundry in Cincinnati, and his successors one in Chicago. Other foundries were begun in St. Louis, Albany, Baltimore, Buffalo, Pittsburgh, Louisville and Cleveland, and additional ones in Chicago, Cincinnati, New York, Philadelphia and Boston. Many notable names are to be found among those who practiced type-founding or are now engaged in it, as Hagar, Lothian, Ryan, Dalton, Allison, Collins, Barth, Wells, Phelps, Marder, Benton, Phinney, Rounds, the junior Conners, McLeester, Lindsay and Lyman. Much progress was made in the art, new procedures had been introduced and the quantity of type sold had largely increased. In 1885 there was a uniform scale of prices, but several firms covertly gave large discounts. A Chicago firm growing angry, the list price was sharply cut and all of the various houses throughout the country were soon at war. Discounts were made of 30, 40 and 50 per cent., and even larger when necessary. While this contest was going on many attempts were made to compromise or bring about a truce, finally resulting in the formation of a gigantic trust or monopoly, in which two of the large houses in Boston, one in New York, one in Philadelphia, two in Cincinnati, one in St. Louis and one in Chicago joined, together with a dozen smaller establishments. These were bought out by a company known as the American Type-Founders' Association, and were paid for partly in cash and partly in stock, but at extremely high prices. Outside of this combination there are two large houses in New York and one in Chicago, with a dozen smaller foundries. Prices for type are now the lowest ever known in the United States. The last figures shown above are not the bottom prices, but are subject to still further discounts, which fluctuate with the individuals. Some firms are selling by the list prices of 1885, with a large discount, and others by the

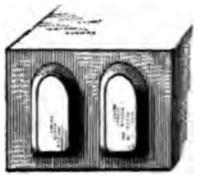
Type-Founders' Association prices of 1892, with or without a discount.

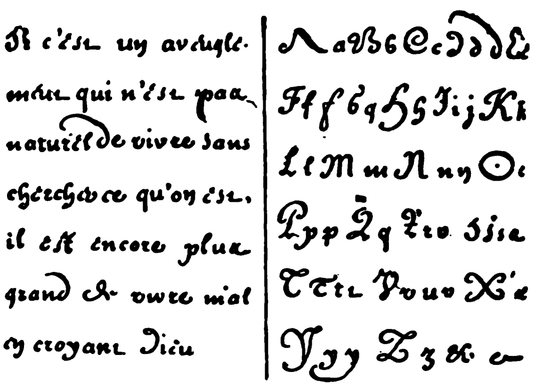
In Germany there are many large type-foundries, and to a certain extent American founders have been obliged to draw on Germany for a supply of skilled workmen. There are many excellent founders also in France. In Italy and Holland there are several foundries, but there are few in the remainder of Europe, except in Great Britain. There are none in South America, and it is believed none in Asia, except some of limited capacity attached to missions. Neither are there any in Africa.

The first step in type-making is the preparation of a punch. This is a type in steel; it must be in that metal, for it is only used to be driven into a copper plate, and it must be perfect in face, for the cast reproductions imitate it faithfully. The workman receives his idea from a rough drawing of the master founder, or from examination of a specimen, which he is told to imitate with or without changes. Usually speaking, if it is a new series, the letters are first cut upon long primer or pica, and then others are made above and below. One American founder, however, prefers brevier. The letter m is first taken. In this the thickness of the main strokes and their distance apart are first considered. There are three upright strokes, as ı ı ı, and they are connected at the top. If the face is to be a heavy one, these upright lines are made slightly thicker; if the face is to be large, the strokes are longer; if it is to be open, they are made farther apart. The differences between them are very slight. A body mark which is one-fifth in thickness of the whole height of an em will give an entirely different appearance to a letter from that which is two-elevenths or two-ninths. In a light book face the three body marks of an em are only equal in thickness to one-third of the face; consequently the space between the first two legs and between the second and last leg is wider than two body marks. It might be increased to three times this measurement, or even more. The le[illegible] rom which this measurement is taken belongs to th[illegible] sic book faces of half a century ago, and it is only half as high as it is wide, but it is not infrequent to see a face resembling that referred to in thickness of body mark and width, but from one-tenth to one-third higher. All of these points must be considered. The form of the serif must also be considered. The serifs may be flat, stubby or bracketed. The centre of the letter m is hollowed out or marked out by counter-punches. The little s[illegible] bar, somewhat longer than a type, is held in a vice, the face above. A hardened steel tool, having a shape like the inside of this, is placed in position over it and is driven in by a hammer. The recipient is soft steel and receives the impression easily. It is then hardened. The punch then looks like the engraving annexed. It is easier to drive in the tool than to cut out those parts which should be left hollow, but the marks may require to be enlarged and deepened. The slopes also may not be accurate. The remainder of the engraving of the letter is accomplished by gouges, chisels and files, minute callipers and measures being employed to test the progress of the work. As the letter is in progress a proof is taken frequently by holding the bar over a candle, or anything which yields smoke, and then pressing it upon a piece of paper. When the m is completed and apparently perfect an H is begun. In this the body marks are about one-half thicker, and the serifs are larger and deeper. The counter-punch is again employed, and the other tools as before. Each letter must have a little space above and a little below, as well as space at the sides. These spaces are provided by the fitter, and the punch-cutter need not be concerned about them; but he may receive instructions to have tall ascenders and descenders, or to have short ones. In this case each letter has new proportions. Much is done by the eye. The thickness of stroke after the first letters have been begun is invariable, and so is the height and depth of each class of characters, but minute differences may exist between other letters. After a few characters have been executed a careful proof is taken, showing each of them side by side. An examination then may show that there is a lack of harmony, or that the face is going to be too thick or too thin. In this case some must be reengraved. The deformed letters are g, a and s. Little is expected of them. The o and other round letters must be somewhat larger than the square letters. Otherwise they would appear to be smaller, the eye being deceived. Script is very difficult to cut, as the curves of one letter must exactly join those of another. Roman is next in point of difficulty. It is understood in type foundries that the cutting of two letters a day is a fair amount of labor for one man. It is usual for founders, when they cut a new face, to utilize as many of their existing characters as possible. Thus one foundry having twenty kinds of long primer Roman will not have more than eight kinds of small capitals of the same size. Reference marks, figures and accented letters are thus economized whenever possible.

PUNCH.




RESULT OF USING A COUNTER-PUNCH.


AN OLD SCRIPT—PIERRE MOREAN'S RONDE.

Displayed letters are often suggested to the type-founder by sign painters and engravers. These are hardly ever correctly drawn for his purpose, but they supply hints. Most ordinary fancy faces can be executed more quickly than Roman, for they are not submitted to so close a criticism. They need not line so well nor be so accurate as to shape. Many faces are now cut in such a way that the bottom of the letters for a number of sizes will line together, as on the next page.

Extra letters will always be cut for their customers by type-founders at prices varying from three to six dollars apiece.

Punch-cutting is now executed also by machinery, the apparatus being the invention of L. B. Benton. A model being drawn in lead pencil or ink upon a sheet of paper, an arm of a machine, somewhat on the same principle as the pantograph, is passed around the edges of the design. This is reproduced on a very minute scale by a cutting-machine, which prepares the punch, with its lines and inclinations, just as is necessary. It is much more expeditious than the old method, and enables type to be made in series of which the parts will much more closely resemble each other than is now possible when personal equation is considered.

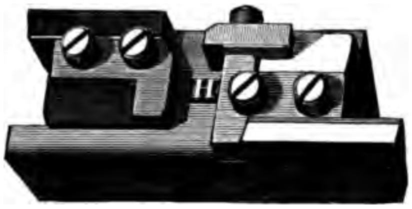
The next problem is making the matrix. The punch, when completed, is like a single letter. Nothing can be cast from it. It must be driven into another piece of metal which is intended to form the bottom of a mold. Then a replica of the punch can be cast. The matrix is a piece of copper of sufficient thickness and weight to keep it stiff and firm. This is laid upon a wooden block, the punch is taken into the workman's right hand, being held perfectly perpendicular, and is then struck one or more times with a hammer or mallet, until the impression is of the desired depth. This is known as a strike or drive. It passes from this to the fitter, who first sees that the impression of the punch is perfectly true and parallel with the face of the plate. He tests it, and if not perfectly true he dresses off the copper until the face of the letter corresponds exactly in its plane with the surface of the plate, being just as far below on the two sides as at the top or bottom. Then the other side of the plate is made to conform to the marked side. When finished it is a strip of copper in which there is an engraving of a letter. At the bottom is another stamp showing to what collection or face of types it belongs. The latter is the type-founder's private mark.

MATRIX.

Electrotyping is also used to produce matrices. The characters can be cut on brass, which is much easier to manipulate than steel, or upon type metal. A type from another foundry can be employed for the same purpose. These characters are suspended in the bath of a galvanic battery, the parts which are not to be acted upon being properly protected by glass and wax, so that the face alone is exposed. They are grown, in electrotypers' usage, to about the thickness of a pica, and then backed with a piece of copper of about the same thickness. After being justified, they can be used for the same purpose as the matrices made by a steel punch. In type metal the process takes about three weeks. Practical type-founders declare that the result is not so good as when the punches are cut on steel, as each reproduction of a letter in a battery dulls and thickens the lines and fills the hollows.

Very large types are now made by electrotyping, as it is difficult to cast them. The top is then mounted upon a square body. In the last century they were cast in the sand, as iron is now cast, and were afterwards trimmed up with the graver and the file.

When it is necessary to go on casting the matrix is fixed in the mold at its bottom. Here the quadrilateral opening in the mold comes to an end. The hollow for the letter is exactly in the centre of this end. With hand-casting this mold was a highly complicated piece of mechanism. The workman held it in one hand while he poured in the hot metal from a dipper into the orifice of the mold, at the same time giving a jerk to the receptacle to make sure that the fused material entered all of the recesses. It was then opened, the type was dropped out, the apparatus was closed up and a new operation begun. This process was always used until David Bruce, Jr., invented a type-casting machine about 1834. By this the metal flowed into a receptacle which was the mold, having the matrix at one end, and was driven in by a force pump, thus insuring a solid and well-cast type. This mold opened and shut, the type falling out with regularity and speed, the machine accomplishing many times as much work in the same time as a hand-caster, the type being besides more uniformly good.



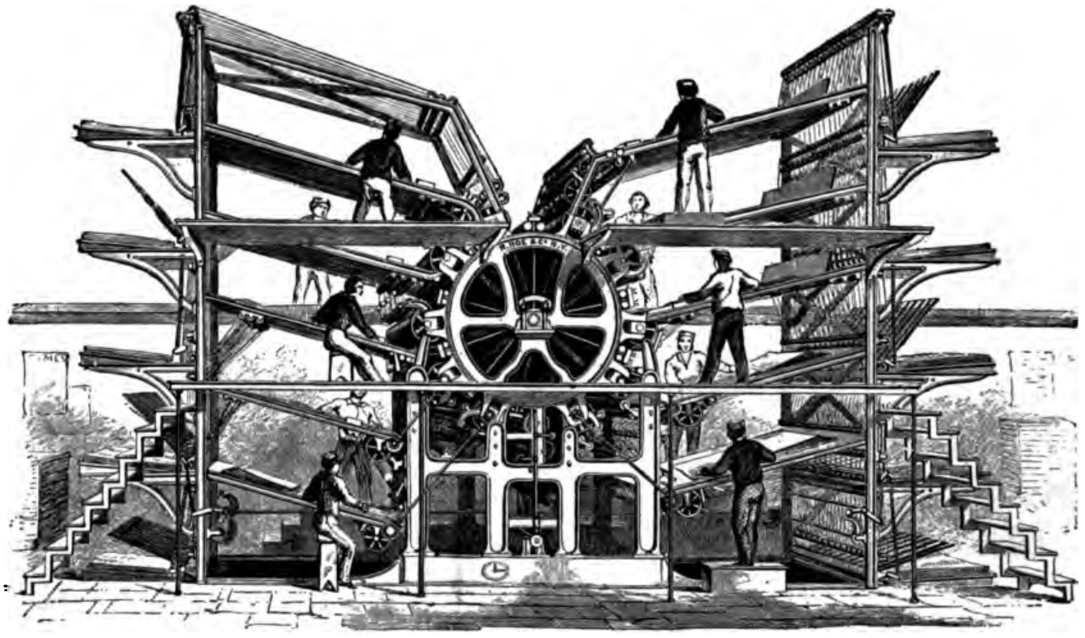
MOLD.

The type, as it is extruded, falls upon a heap of the same characters and is very hot. After it cools, the first operation is to break off the JET (which see), a long pendant of metal.

The type, even after the jet is broken off, is rough and will not stand on its feet. The flat sides of the type are therefore rubbed on a grained stone, which makes them smooth. Boys and girls next take them and set up the letters in thin brass sticks, the nicks and faces being placed in order. The type-dresser looks at the lines, throws out any letters which [illegible] defective in the body and planes a groove in the centre of the base, at the point originally occupied by the jet, thus forming the feet. The face is then examined with a magnifying-glass, all letters which do not appear to be perfect being discarded. The proper proportion of each letter is then arranged according to a prepared scheme on small galleys holding a type-founder's page, which measures 6 by 4½ inches. The pages are then papers and marks with the name of the type, [illegible] letters which each contains, and also with figures and letters unintelligible to the printer, but serving to inform the type-founder what is the face and nick type contained within, what mold it was cast in, by whom it was cast and by whom dressed. This information is retained in a memorandum by the type-founder after the font is sold, and enables him to trace the responsibility for any error which may afterwards be discovered. Usually the quantity is arranged on body type for six hundred pounds, that dividing easily into halves, thirds, quarters, fifths, sixths and twelfths. Fancy types are usually sent without spaces or quadrats, but body types with them.

The hand-casting method has now become obsolete, except for small quantities of type. Everything is cast upon machines, the original idea of which was contained in a machine invented by David Bruce, Jr., who died in his ninetieth year in 1892. His patents were granted in 1838, but the invention was coldly received. After a few years it was copied abroad, and now is used everywhere. Its speed is that of a dozen workmen. Lately machines have been devised which cast, break off the jet, dress, rub and place the characters in line. Most printers believe that the operations are performed very well indeed. There are several different patents, and each foundry has its own way of accomplishing the desired result.

The metal employed in the manufacture of type is a compound, being a mixture of lead, tin and antimony. Sometimes copper is used and sometimes bismuth. Lead is the cheapest of these metals, and melts very readily and chills quickly. Antimony is added for the purpose of giving hardness, in which lead is lacking, and because it has the quality of expanding when cooling, thus insuring that the molds shall be completely filled. If the metal contracted, as most metals do, the letters would be irregular in body and more or less imperfect in the face. Tin is added to give smoothness and toughness. The antimony causes the compound of lead with itself to be hard and brittle. Copper is employed for hardness. There is a dispute among type-founders as to its value and as to whether it can be incorporated properly in the mixture. Many type-founders, and among them the late James M. Conner, a very skillful and experienced man, have asserted that it is not possible to mix more than 2 per cent. of copper in the kettle. A greater quantity may be added, but it will not join the other metals. On the other hand Carl Schraubstädter and John Marder declare that 6 per cent. can be incorporated. In the early years of typography all other kinds of metals were added, including iron, steel, brass and iron wire. The common mixture now, when copper is used as it is at present in many American foundries, is: Lead, one hundred pounds; antimony, thirty-five pounds; tin, fifteen pounds; and copper, four pounds. Part of the lead is first melted and the antimony is added. Constant stirring slowly dissolves this, and the remainder of the lead is then put in. Then follows the old metal (that is, old type, leads, &c.), if any, and then the tin. The copper is mixed with tin previously, forming a bronze, and small quantities are scattered over the melted mass and stirred in. When this is dissolved the whole is ladled into pans. Some founders take thin sheets of electrotype metal and mix them in, the films melting much more easily than heavier pieces. Spaces are made with more lead and less tin and antimony, and quadrats are cast with still more lead. Script requires a specially tough metal.



HOE'S TEN-CYLINDER TYPE-REVOLVING PRESS.

Stereotype metal, electrotype metal, leads, slugs and metal furniture are all cast from mixtures resembling the above, but without copper, and with less tin and antimony. Lead with a portion of arsenic is not employed, as the metal sublimates and obstructs the machine.

The Scotch height of type is much used in Messrs. Spottiswoode's in London. It is about one-hundredth part of an inch higher than the average of English heights, which is twenty-nine thirty-seconds of an inch. French height is one-fiftieth of an inch higher than English, and that of the leading type-founders in Germany about one-ninetieth higher. It is a very little above the Scotch. There is much irregularity in Germany. The foundries that cast to the Fournier measurement of bodies have their type higher than those which conform to Didot. Fournier sizes are largely used in Belgium, but there are few printers in France who employ them. The American height is ninety-two one-hundredths of an inch.

The type manufactured in the United States is said to be valued at about three millions of dollars a year at the list prices of 1885. There are rather more than thirty foundries, but of these fifteen manufacture very little. New York, Chicago and Philadelphia sell the most, next to them being Boston, Cincinnati and St. Louis.

Type High.—Anything the height of type.

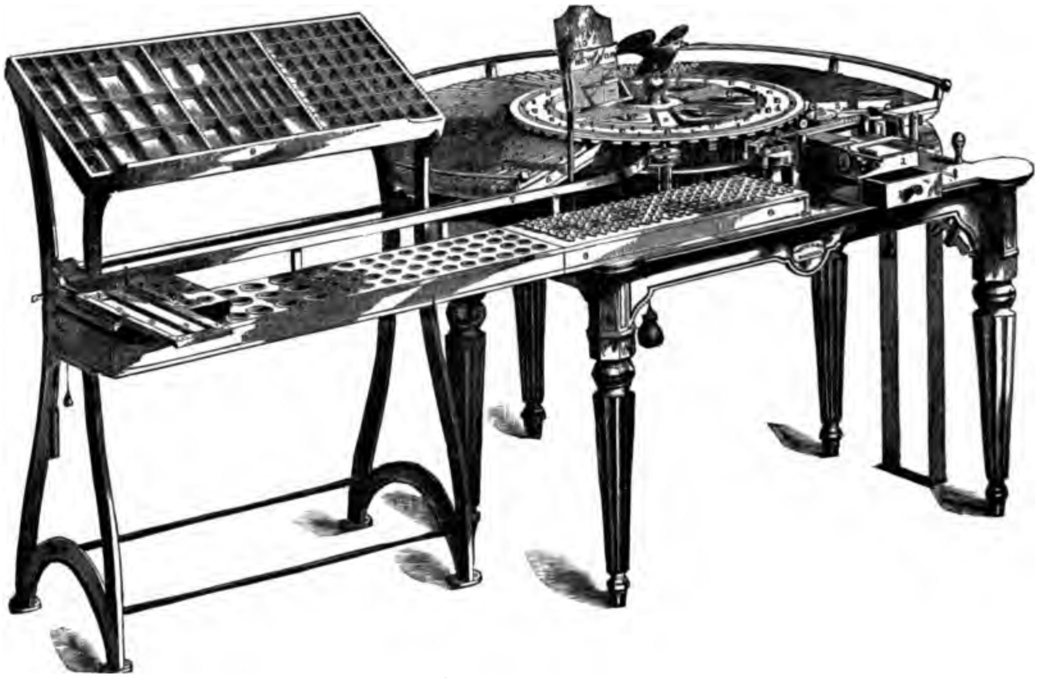
Type-High Chases.—Special chases made the height of type, used for stereotype foundry work.

Type-Holder.—An instrument for holding type when used for lettering a book.

Type-Measures.—Scales of wood or ivory used for measuring type. They are generally of paper in this country, and when much used are covered with glass.

Type-Revolving Press.—After cylinder-presses had been invented and been put into use it was found that they were too slow for newspapers of the largest circulations. Only one sheet of paper could be printed at each forward movement of the press. By having a feeder at each end and stopping and reversing the cylinder after one sheet had been printed, then printing another sheet on the returning movement, a double speed was reached. Newspapers, however, must be so supplied with machines that in a very few hours the whole edition can be turned out. In New York two thousand copies were regarded as a large circulation in 1830. By 1840 ten thousand was no longer considered great; newspapers contemplated printing twenty, thirty or even forty thousand copies upon occasion. Several inventors wrought upon this problem. In 1828 the Christian Advocate of New York, which then had a circulation of eight thousand copies, was printed upon a type-revolving press. The types were secured around the circumference of a cylinder, and at each revolution a copy was printed. In 1835 Rowland Hill, in England, took up the same idea. His types were taper, but with a notch at their sides. Metal binding strips inclosed the pages, a projection in them fitting into the notch at the sides of the type, and the whole were secured in chases fastened to the cylinder. A continuous roll of paper was to be used, the paper afterwards being cut. It was to be a perfecting machine. It does not appear that one ever was made and put to use. The actual introduction and continued use of a type-revolving press was, however, due to Richard M. Hoe of New York. At about the same time that he perfected his invention an English mechanic completed a device of the same nature, but with very different arrangements. Augustus Applegath's invention was patented on December 21, 1846. It was first employed on the London Times in 1848, but was preceded by Hoe's machine, patented on July 24, 1847, and which was in use before the close of that year upon the Philadelphia Ledger. The great merit of Hoe's machine was the natural method in which the paper was handled and the certainty with which the type was retained. The characters were set up as usual, but with curved brass dashes and curved head-rules. The matter was made up on a brass bed, each page requiring a different bed. This bed, commonly called a turtle, was curved, exactly conforming to the cylinder, the centre of the page, from right to left, being highest. Each column rule was thicker at the top than the bottom. A slot in the head-rule received it, and the end of the head-rule in like manner fitted into the metal sidestick. At the bottom the ends of the column-rules were secured by the footstick. When the type was emptied in and planed down locking up began. This was by screws, which moved one sidestick against another. An immense power could thus be exerted. No body of type could fall out, for it was held securely by the column rules, and they again were held by the pieces which pressed against them. Each of the turtles was fastened against the side of a huge cylinder, and each time that revolved a copy was printed for each feeder. The first machines were four-feeders. As the cylinder passed around the type-form was carried to an impression-cylinder, and the sheet of paper, being fed in, was immediately caught, printed and drawn away from the press. The form was again inked, another sheet was fed to it, printed and taken away until each of the feeders had supplied a sheet and had received on his fly-table a printed copy. It is evident that this process of printing could be repeated at every foot of the circumference, which was fifteen or twenty feet, if nothing except the skill of the mechanician were concerned. A foot would be sufficient for an inking apparatus and for an impression-cylinder. The four-cylinder press was soon superseded by a six-cylinder press, and that in turn by eight and ten cylinders. The theoretical speed of the cylinders was three thousand impressions an hour. As that, however, was faster than feeders could supply paper, the machines were geared at a much lower speed. Accidents and stoppages practically brought down results to fifteen hundred an hour. An eight or ten cylinder press was as large as an ordinary three-story house, and a newspaper which printed many copies required much space in its pressroom. The largest size was thirty-seven feet long, eighteen feet high and twenty-one feet wide. It weighed 62,000 pounds. This machine was gradually succeeded by web presses, which were much more compact and required much less labor. The Applegath press went into use later than the Hoe press, and was finally superseded by it in England. An engraving of it can be seen on page 22 of this Dictionary. The sheets were upright when printed, to accommodate themselves to the cylinders, which were also upright. So awkward a method required great mechanical ingenuity in its other contrivances. Web presses have now been substituted for it. The Hoe lightning press was for many years regarded as one of the wonders of the world. The more modest web press performs its labor at much less cost and in less room, and the only value now of the type-revolving press of the style of 1860 to 1870, either Hoe or Applegath, is as old iron. Perhaps one hundred were in use.

Typesetting-Machine.—A machine which is used to place letters in orderly arrangement for use in printing. At present the phrase is loosely used for type-composing machines and for those which cast letters or slugs for the same purpose, although strictly speaking the latter do not set type. Until 1821 no attempt seems to have been made to substitute machinery for the human hand in composing type, and even at that day the effort was only theoretical. Plans existed, but they were never reduced to metal. Dr. William Church, a native of New England, was in England in 1821, attempting to introduce a new press. He had, however, other inventions which he desired to bring out, and in 1823 announced that he had discovered a method of casting and composing type automatically, but this invention did not include distribution. It would have been found less expensive, under Dr. Church's management, to melt the type and recast it than to distribute it. It is difficult to understand from the description of the machine in Hansard's Typographia exactly how the work was to be accomplished. The letters were molded in one part of the machine, and then arranged in grooves or slips, from which they were dislodged as in all type-composing machines. They fell upon a plate, from which they were swept by collecting arms into a curved channel, which answered the purpose of a stick. Justification was to be done by hand. It does not appear that any machine on this plan was made, or that the design passed beyond its wooden model. In America the first patents granted were to Frederick Rosenberg and to Young & Delcambre, in 1840 and 1841. The patentees were presumably foreigners. Another patent was granted to Rosenberg in 1843, and one to O. T. Eddy in 1850; but the first machine of the kind which was practically used for work, and which continued commercially to compete with the hand-compositor, was the one invented by William H. Mitchel, a brother of the Irish patriot. He took out his first patent in 1853, and others in 1857 and later. The writer saw one and operated it in 1859. It was a gravity machine, but in order to allow the type contained in the remoter reservoirs to reach the assembling place as soon as those nearer, thus making the types follow each other in regular succession, the letters were deposited upon tapes, the longest tapes running at the greatest speed. John F. Trow of New York had twelve of these machines as early as 1855, and operated them the most of the time. The distributor did not work very well, the separation being badly performed; but the compositor was able to set about four thousand ems an hour. Since 1855 typesetting-machines have been constantly in use in New York. The Alden was in operation before the Mitchel fell into disuse, and the Burr has now been employed for about eighteen years. Other notable inventors in the United States have been Alden, Thorne, Paige, McMillan, Rogers, Mergenthaler, Foster and Felt. In the Old World there have been Lagerman, Hattersley, Fraser, Mackie, Kastenbein and Hooker. There are over a hundred other inventors, each requiring several patents. Immense sums have been paid out for the construction and improvement of typesetting and distributing apparatus, as to accomplish the end required the most exact mechanism must be employed, and the slightest variation from the best forms will destroy their working. The problem is now mechanical and not inventive. All possible combinations have been used, and every basic idea has been evolved. What is now needed is selection from these ideas and perfect workmanship. Almost any typesetting-machine will require the expenditure of from forty thousand to eighty thousand dollars before any printer will be found bold enough to make a trial of it in his office, and as much more before it is reasonably perfect.



ALDEN'S TYPESETTING-MACHINE.

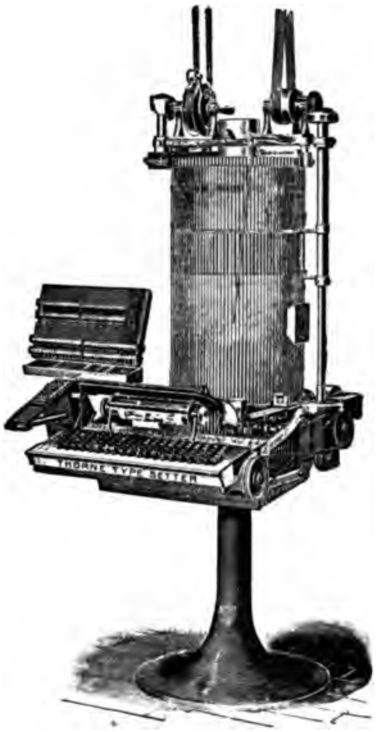
There are two chief types of these machines. One drops type into channels which convey them to something answering to a composing-stick, and the other casts letters in a matrix or matrices. The former is the older plan. A simple composing-machine can be made by setting up the letters, each by itself, and putting them into grooves. A little catch holds the bottom of the groove so that the type shall not tumble through. Below is a keyboard. When a key is struck a little hammer drives out the bottom letter, which passes through a groove to the place of assembly. So much of the thought as this has occurred to thousands of inventive minds; but when the question comes up as to how the hammer is to act, how the column shall be held firmly while one letter is taken out, the shape of the channel, the stoppage of the letter and the movement of the line so that space may be left for other letters, much mechanical skill is required. It may be said that so far even these problems have not been conquered. The letters are of various weights and thicknesses; they fall unequally; they turn around unexpectedly; they rebound at the bottom of the channels, and the dust and solid particles which adhere to these grooves and to the types render uncertain the delivery of the characters. The usual method is to have the grooves for delivery from the reservoirs of different thicknesses, say, one the thickness of an m, another of n, another of s, and a fourth of t. Thus when the letters drop from the reservoirs they converge into these grooves, and there they must slide down as they begin. When they reach the bottom of these four grooves they have acquired so much momentum that they cannot turn around, and are moved along by a little wing or arm, which vibrates with great rapidity. It is very light and touches the type very delicately. This piece of mechanism is, however, strong enough to propel forward a small line of type. The type is generally taken away and justified by hand, but sometimes it is done more or less completely by machinery.

Justification has so far been accomplished only by one machine using movable types, but the McMillan machine and the Lagerman Typotheter, in England, have partially succeeded. The machine counts the number of spaces in the line and measures the distance required; but in these two there is a call for an instant for human volition. The Paige requires no assistance; but no explanation has ever been made of the processes in any of these machines. When the labor is accomplished by hand several devices are in use for increasing the facility with which the workman can handle the long line and break it up into lines of the required length. The speed of the justifier on bookwork is about four thousand ems an hour, but on some classes of work rather more. An improvement, first introduced on the McMillan machine, was to have the composed line run off on storage galleys, so that the shorter lines could be made up and justified afterwards. On the Lagerman Typotheter a bell rings when enough for a line is completed.

Distributing-machines all act upon the principle that each type is pushed out through its own particular gate. The line which is to be distributed begins with a letter which has certain nicks upon it. It passes along and past a number of exits, touching each one closely, and being forced towards them by a spring. It cannot, however, go out, for at each of the gates there are projections which forbid passage. If the projections and nicks exactly correspond the letter goes through readily, as a key passes into a key hole. It cannot go out anywhere else, for the form of the gate is such that it admits its own type only.

The Burr machine has its type pass along a straight avenue of gates; the avenue on the McMillan machine is circular. Many lines are contained in the channels of this machine at once, and each channel, in one revolution, will distribute at least one letter, but may distribute many. Thus it has been found practicable on this machine to distribute twelve or fourteen thousand ems an hour. The Thorne machine distributes as it sets, and rather faster, so that from time to time the distributing cylinder must be stopped, or the setting channels will be too full. It also distributes many lines at once.

Many special machines have been constructed on slightly different theories. The Hooker machine and some others set up by hand the lines of type for the composing apparatus. The Thorne machine, which is very compact, sets and distributes at the same time. When a type falls from the composing channels it rests on a metallic plate which revolves quickly, and is by that swept onward to where the words are formed. The Paige machine takes the lines from the galley and distributes them at the same time that justification and composition are going on. The Lagerman machine is an assistance to the compositor by which he has the use of both hands, tossing type from each into a funnel, when the mechanism catches the letters, straightens them up and turns them around if necessary.



THORNE TYPESETTING-MACHINE.

Type casting and setting machines depend upon the placing of matrices in position, and having, in addition, some apparatus like the casting-machine in a type-foundry. Justification is effected by the double wedge, which drives the words apart as far as may be necessary. Distribution is accomplished by melting the type. Composition, when a single letter is to be cast, is accomplished by moving the matrices of a font in such a way that the right one is presented against the orifice by which the metal flows and is forced out of the casting-pot. The casting-box is long, narrow and rectangular, the matrix forming one end. As soon as the type metal is driven in against the letter en creux it chills, solidifies and is immediately taken away, another matrix meanwhile taking its place. The Lanston and Westcott machines have been the most prominent of this type. Other machines, such as the Rogers, Mergenthaler and Shuckers, cast a whole line at a time. When a key is struck a matrix is disengaged and falls into a new position. Between each word, where a space should be, are the sharp ends of a double wedge. When all of the matrices for a line have been placed in their proper position the wedges are driven in until the line is exactly spaced. Then the cast of the line is made, the slug is trimmed and the matter is added to the galley. The matrices are distributed according to their notches or nicks, each being different. In the Schuckers machine the punches were dropped to the right distance, then joining with the others in making a line. The words were forced apart as before, the assemblage of punches then being driven into a bar of soft metal, thus providing a matrix of the whole of that line. This piece of metal was cast from, the mold being cool and the original not having been heated. In all matrix machines the heat warps and throws out of line the characters produced, as the separate letters are heated unequally. By the punch method the characters are cold and are driven into a cold substance. In the Rogers machine a number of operations are performed very simply and economically.

Among the machines for composition, not elsewhere particularly described, is the Hooker, a modification of the Mitchel, long used in England. A series of contact plates are beneath the hand of the compositor, who touches them as he requires them with a metal stylus. Electrical communication from this causes types to fall from troughs into channels, from which they are collected as in other machines, but upon tapes. The ordinary type is used. In 1882 Porter's type-composing machine was introduced in England. In this the types are taken by hand out of the various troughs. Carpenter's machine sets a combination of letters, which are cast at one and the same time. Thus he claims that a speed of from fifteen to twenty thousand ems an hour can be obtained. The Dow machine resembles in theory the McMillan and the Kastenbein. The Fraser, a Scotch machine, is also on the same plan. Electricity and air have both been tried on some of these machines in order to accomplish certain results, but both have now been abandoned. The more common mechanical devices are more valuable.

A very great improvement on machines will be accomplished when the copy is prepared for them beforehand. Mackie experimented years ago with this problem in the Old World, and Munson and Lanston have done so here. It will be plain to any one who watches a typewriter that no operator, even the fastest, strikes the keys with regularity. Three or four letters are imprinted with great expedition, and then another after a considerable interval. Stoppages occur for three, four or five seconds, or even longer. Were the keys to be touched at a regular rate, although not the swiftest, far more would be accomplished. On a typesetting-machine a man can touch five or six letters in a second, but he does not actually touch over five in two seconds. If he could manipulate the keys on one machine, record the result, and afterwards so connect this record with another machine which did the actual typesetting at the fastest rate which it ought to stand, he would find that all of the copy he could prepare in a day could be set by a machine in half a day, and that in another half of a day all could be set which was similarly prepared by another man. Such auxiliary machines would be cheap and would double the capacity of those which are dear, although the latter might be apparently going at no greater speed than when doing the entire work of typesetting. The inventors have accomplished their part of the work, but so far capitalists have not taken hold. The use of such auxiliary machines would remove a great objection to the employment of mechanical compositors. None of the machines set type enough to make them profitable under all circumstances and with all men. Most of the apparatuses are now well made, but further improvements and changes are necessary. The keyboard and the use of logotypes have been little studied, and there have been few efficient instructors. At present it seems undoubted that daily newspapers can make money by adopting such machines, but the book trade has used few, and with those which have been employed they have not been very fortunate. The machines most used in Europe are the Kastenbein, the Hattersley and the Thorne; in this country the Mergenthaler, the Thorne and the Burr have led. Others which are newer, but are used to some extent, are the Lanston, the McMillan and the Rogers. Perhaps there may be four hundred and fifty in all in use in the United States. As the number of compositors increases at the rate of three thousand a year, there being already one hundred thousand in this country, it will be seen that it will take many years for even a fraction of these workmen to be superseded by machine compositors. In New York city, where more have been displaced relatively than elsewhere, the number of machines of all kinds operated does not reach two hundred. These numbers represent forty years of continuous trial and the sinking of many fortunes in these various attempts. At present the demand for machines of all kinds does not equal two hundred a year. These would perhaps perform as much work as six hundred compositors, but require three hundred operators for this purpose. At present the introduction of machines has produced no appreciable effect upon the trade, considered either as employers or journeymen.

Type Slinging.—An expression sometimes used humorously for typesetting. Picking up stamps is another expression of the same kind, and so is type lifting.

Typewriter.—A mechanical apparatus for writing by means of type. Machines of this class have come into very common use in America and to a less degree in Europe. An entirely new calling has been created by it. Instead of gathering a number of types together, as in typesetting-machines, a touch of a particular key causes the corresponding letter to strike in a certain place upon a sheet of paper. As soon as the impression is made the paper moves forward the width of one letter, and when the next key is touched the character follows the preceding one at a proper distance. All strike at the same point. Inking is generally accomplished by causing the blow of the letter to be given upon a ribbon which is charged with color. This is against the paper, and when it is percussed a letter appears. To enable the paper to be moved its proper distance after each impression, the characters are all made of the same width, the i being as wide as a W, and the l as an m. The wider ones are compressed and the narrow ones have much side-bearing. At the beginning there was much difficulty in alignment, but little by little this has been overcome. The experiments, however, have been very expensive. The first machines of this kind were made more than fifty years ago, and experiments have been continuous for over thirty years. Commercially, however, typewriters have been sold some fifteen or sixteen years only. As now made they give very plain and excellent copy, and can be operated very fast. In the course of ten hours some expert operators can produce thirty thousand words, and in an hour five thousand words. The ordinary compositor does not much exceed three hundred words in an hour, and a fast one five hundred. When typewriters employ a more permanent ink many uses will be made of them which are not now attempted.

REMINGTON TYPEWRITER.

Typing.—An amateurish term applied in England to the setting of any particular line or matter.

Typo.—A short term for a printer.

Typogravures.—This is the name given by Boussod, Valadon & Co., successors to Goupil & Co. of Paris, to half-tone pictures printed from copper relief plates, which are apparently etched either by means of bitumen, chromatized albumen or some other similar sensitive coating. The surface of the metal is grained substantially in the same manner as plates prepared under Meisenbach negatives. These plates are much used in Paris by the illustrated papers.

Typographer.—A printer from movable types.

Typographia.—A society in England, formed for the purpose of promoting better instruction in the printing art. It aims to accomplish this by lectures, by direct instruction and by comparison. It also endeavors to settle disputes and to exhibit specimens of printing and the appliances of the printer's art. The first president was Henry H. Bemrose of Derby.

Typographic.—Relating to the art of printing by means of movable letters.

Typographical Societies.—Organizations composed of printers or intended for the furtherance of some printers' end. In the United States this term has generally been employed in reference to certain benevolent organizations in the great cities which have lasted for many years. One of these is the New York Typographical Society, founded in 1809. It continued as a trades-union until 1817, when it abandoned that feature. In 1823 it established a library, which it maintained until 1887. See NEW YORK. The Philadelphia Society was organized on November 6, 1802, and was chartered in 1810. In 1831 it was reorganized. It has paid out in all over one hundred thousand dollars. Among its members have been Mathew Carey, James Ronaldson, Archibald Binny, Isaac Ashmead, John C. Clark, Lawrence Johnson, Thomas MacKellar, Louis A. Godey and George W. Childs. The Charleston Society was begun in 1820, and that in Boston over sixty years ago. There have been others in Albany, Cincinnati, New Orleans and elsewhere, each doing good work.

Typographical Unions.—The name of the societies in the United States which are designed to protect the interests and advance the welfare of journeymen printers. Such organizations in England are known as typographical societies. Under different names and forms they exist nearly everywhere in the world where there are a hundred printers in any town, and they have also been organized in many branches which are not really printing, but only allied to it, as that of the mailing men in New York and the pocketbook-makers in London. The theory under which these societies are formed is explained under TRADES-UNIONS, as well as the reasons which have induced many to believe that they are of little value or are a detriment to the trade. The development of their organization for fifty years is given under INTERNATIONAL UNION, and the progress of the idea within the last century under NEW YORK, where the earliest association of the kind on this continent was formed and where the first American strike took place.

Typographie (Fr.).—Printing.

Typography.—The art of printing from movable letters. During the four years which have elapsed since this work began there has been no new light upon any of the problems of early typography. It was hoped that more thorough knowledge could be obtained of the connection between Jenson and Mayence, and of the alleged discovery of the art in Avignon. Expectations from the former source have been disappointed, while the details from Avignon are very unsatisfactory. A tract was issued in 1890 by the Abbé Réquin with the title L'Imprimerie d'Avignon en 1444. It bases its statements upon documents in Latin preserved in that city. At the beginning of 1444, says the abbé, a jeweler from Prague, named Procopius Waldvogel, who was in business at Avignon, disclosed to a Jew of that city, Davin de Caderousse, the details of a new system of artificial writing. Two years later, in March, 1446, he undertook to provide Davin with the necessary materials for the reproduction of Hebrew texts by this new method; that is to say, to supply twenty-seven Hebrew characters cut in iron, together with the necessary tools and apparatus of wood, iron and tin. The Jew promised the most profound and absolute secrecy as to the practice of the new art. In the same month Procopius exacted a renewal of the promise on the occasion of delivering to him further material necessary for the production of Latin texts by the new method. Two other persons were acquainted with the secret, both inhabitants of Avignon. One was Ferosse, a locksmith, and the other was Georges de Jardine, both of whom bound themselves to preserve the secret. In 1446 they bought the tools and apparatus of two other practitioners. These two, Vitalis and Coselhac, were scholars of the town who had been initiated into the secret by Procopius. The property purchased by the Jew and his two associates consisted of two A B C's in steel, two iron "forms," a steel screw (query, screw-press), forty-eight "forms" in tin and several other "forms." In surrendering these Vitalis took an oath on the Four Evangelists that the art of "writing artificially" was a genuine and useful art—a precautionary testimonial, apparently exacted by Procopius in view of the suspicious attitude of the Inquisition towards any new invention.

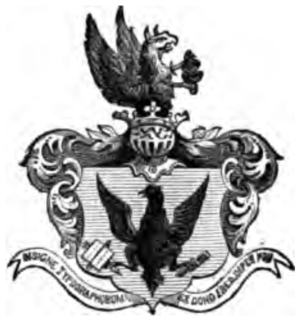
Until this narrative has been examined closely and the historical clues given followed up it will be impossible to know how closely this invention came to typography. It might possibly be a method of stamping words upon the covers of books, as in binding, or it may have been used in the manufacture of dies. Evidently the quantity of tools mentioned would not be sufficient for printing with types.

Typometer.—A type gauge used to set the standards of type and to see whether they have been accurately cast and dressed. It is thus used in Germany, and the same word in the French form is employed in France.

Typometry.—The art of composing and printing maps, &c., by means of movable types; same as Landkartendruck.

Typothetæ.—A society of master printers or employing printers. This name, it is said, was formerly applied by the Emperor Frederick III. of Germany to the printers of that country. In 1470 he granted them a coat-of-arms. Upon this was displayed an eagle holding in one claw a composing-stick and in the other a copy-holder or visorium. A griffin held in its claws two inking-balls, which formed the crest. The word typothetæ signifies type-placers and is from the Greek. It is pronounced by the members of the societies now existing under that name ty-poth'-e-te, but it is said by good Greek scholars that it should be pronounced ty-po-thē-te. Its use by printers of to-day is due to Peter C. Baker of New York, who discovered it in some old works on printing and thought that it would be an appropriate title to employ at the present time. He did not know its classical pronunciation, but gave it the same accent as in hy-poth-e-sis, a-pos-tro-phe. The word was applied only to the New York society until the summer of 1887, when similar societies were formed in St. Louis and Chicago. Afterwards more than fifty other bodies were organized bearing this name, as well as one including all English-speaking printers in North America, having the title of the United Typothetæ. Most of these societies celebrate with a dinner, on January 17, the anniversary of Franklin's birthday, and all elect delegates to an annual meeting in some city of the United States or Canada. The meetings have been held in Chicago, New York, Cincinnati, Boston, St. Louis and Toronto.

The object of a typothetæ is to foster trade and commerce; to shield its members from unjust and unlawful exactions; to diffuse accurate and trustworthy information as to the standing of merchants; to acquire, preserve and disseminate information relating to the printing interests of their own and other cities; to produce uniformity and certainty in the customs and usages of trade; to settle differences between its members, and to promote a larger and more friendly intercourse between printers and between merchants. It lessens differences between printers by bringing them together and teaching each to know the characters of the others. It is educative, as by this intercourse those who are less skilled than others can obtain information as to difficult or unusual processes. It promotes higher and more uniform prices, showing inexperienced or wavering printers that a certain ratio of profit must as a rule be obtained or bankruptcy will follow. Among the measures undertaken by local societies have been the publication of a list of slow, undesirable or non-paying debtors; the estimation of the cost of work, adding to the obvious items the smaller, which must always be considered; the formation of committees to obtain better prices from insurance companies and to prevent unjust discriminations against printers; to investigate typesetting-machines and other new inventions, and to consider various plans of bookkeeping and scrutiny of work. Aid has been extended by one printer to another in his work and ruinous competition has been lessened. It has been assumed by many that the Typothetæ was originally begun to attack organiza-



TYPOTHETÆ COAT OF ARMS.

tions of workingmen and to destroy them. This is entirely erroneous. As the unions and the Typothetæ have different interests, they have been and will be occasionally in antagonism, but the liability to this has been greatly lessened by the organization of societies of master printers. The representatives of the union or unorganized labor can find employers who are willing to listen to their grievances, and who have power enough behind them to reform them completely if they shall desire to do so. Before 1887 the unions met with individual employers, each able to control his own office, but having little influence elsewhere. A reasonable complaint can now always be attended to. Since the reorganization of the New York Typothetæ in 1885 it has had only one strike to contend with, and that the officers of the union declared afterwards to the writer was ill-judged and they were not sorry that it failed. No oppression of the workingman has followed. The Typothetæ offices are those in which high wages are paid and the best workmen employed. Societies of master printers in the United States do not appear to have existed before the Civil War, the solitary exception being the Faustus Club of Boston, which began ninety years ago. At times of strike the employers came together for a few days, but when the occasion passed by they saw no more of each other until the next strike, perhaps five, ten or fifteen years later. See further under **New York** and **United Typothetæ**.

U

U THE twenty-first letter in English. It is not used as often as either of the other pure vowels, and also several consonants, but many letters are also less frequent. It is a little thicker than an en quadrat. When overturned its chief difference from an n is that the serifs are only at the right side of the perpendicular bars instead of running completely across. Until the second quarter of this century u and v were sometimes classed as the same letter, and dictionaries would insert Villiers as the next article after Uhland, instead of having all of the words beginning with U come first and then all of the V's. In the Middle Ages there was only the one letter, with the two forms, acute and rounded, and whether a word was written euer or ever, uery or very, vse or use, signified little. As a consequence of this confusion the upper case makes no allowance for more than one letter in alphabetical order in this place, the most common way in the second row being, P, Q, R, S, T, V, W, the U going at the end of the alphabet as the twenty-sixth letter; but in some offices the order is T, U, W, and the V going to the end. In the lower case the u and v are alongside of each other. It is much more common in monumental inscriptions, even in English, to use the V than the other form.

Ueberlaufen (Ger.).—To run over.

Ueberschlagen (Ger.).—To calculate or to cast up manuscript; to determine the size of furniture necessary for a form.

Uñas (Sp.).—Grippers of a cylinder-press.

Uncial.—A style of written character found in Latin manuscripts from the third to the tenth centuries, which combines the more ancient capital letters with the more modern minuscule or small letters. This transitional style of writing slowly altered into the easy, small, running character, and in its most improved stages is known as the semi-uncial. The minuscule began to prevail in Latin manuscripts of the ninth century, and the Greek of the tenth. This style of writing was formerly termed unciales literæ, or text letters, the word probably being derived from the Latin word uncia, or an inch, descriptive of their large size.

Unclean.—A take in which there are many errors. Thus used in England.

Uncut.—Untrimmed. This word, as applied to the leaves of books, does not imply that the leaves have not been opened, but simply that the plow or paper-cutter has not been employed. Uncut books are more valuable than cut ones, as their being in this condition shows that they have not been handled so much and that their margins are still liberal. The binder, in his effort to make the edges even, cuts off so much that the book is generally considerably reduced in size.

Under Hand.—A phrase used by pressmen for the light and easy or heavy and hard running-in of the carriage of a hand-press. Thus they say that the press goes light and easy under hand, or it goes heavy or hard under hand.

Underlay.—That part of the process of making ready which consists in seeing that every part of the form is of equal height, the letters touching the rollers and the impression being even. This is accomplished by laying pieces of paper under the low parts.

Under-Runners.—Continuation of side-notes running under the foot of the page in a similar manner to a foot-note. This expression is little used.

Uneven Pages.—Pages with odd folios, such as 1, 3, 5, &c. They are also called right-hand or recto pages. In making up, an even and an uneven page always accompany each other. The margin on the outside of these two pages is always wider than the margins between the two.

Unfair Fonts.—Type in which the letters are very thin, preventing a compositor from earning his usual wages. Almost all type is now thick.

Unfair Offices.—This term is applied by society or union hands generally to those printing-offices where the existing scale of prices is not recognized. Closed offices are not necessarily unfair.

Ungathered.—Books delivered to binders in sheets; that is, not gathered into books.

Uninterleave.—To withdraw the sheets which have been placed between printed work to prevent set-off.

Unit.—By the Benton system of regulating the width of types a method of calculating so that each size can be divided into fractions which shall also be fractions of a pica em. Each of these sub-divisions is entitled a unit. Twelve units of nonpareil may equal a pica, or seven of small pica; all of the characters of a given font are multiples of that unit. The composing-stick being set to so many units, every line must either fill the measure or fall short of it one, two, three or more units. It cannot be a little less or a little more. Thus a more perfect justification can be obtained than would be likely to be attained in any other way. Spacing out or taking in can be accomplished by changing a three-unit space for a four-unit space, or a two for a four, or vice versa. There are therefore no en quadrats, three-em spaces, four-em spaces or five-em spaces, except as they happen accidentally to agree with the body. The quadrats also are multiples of the unit, and differ (except accidentally) from other quadrats. Under Mr. Benton's system he has an agate of which the letters, figures, points, spaces and quadrats are just the same as in one of his nonpareils. In these there are twelve units to pica. On one-sixth of this there are i, l and several other letters; on three units c, e, r, s and many other characters, and on four units many letters. He also has an eleven-unit nonparcil, an eleven and a ten unit minion; an eleven, ten and nine unit brevier; a ten and nine unit bourgeois, a nine and eight unit long primer, an eight and seven unit small pica and a seven-unit pica. These varying sizes are so that there shall be a choice between thick and thin fonts. The agate is 16⅞ ems wide to the alphabet. This is the widest, the thinnest face being the eight-unit or small pica, which gives a width of 12⅔ ems. It is doubted by many printers whether the loss by abrasion and the augmentation by dirt will not soon change the sizes of the characters, so that the line of agate which originally contained 360 units will receive only 359¼ or

359½, or become so much thinner as to take 360¼ or 360⅛, in which case the entire value of the theory is lost. The greatest objection, however, as stated in a previous article, is that some types will be cramped to enter the space required, while others must be widened, thus deforming them and injuring their beauty. Taking the measurements previously given of three faces, one each from Bruce's, MacKellar's and Farmer's foundry, it will be seen how much they must be widened or lessened to meet the new requirements, frequently to their detriment. The width of the alphabetic characters in nonpareil is one-sixth, one-fourth, one-third, five-twelfths, one-half and seven-twelfths of pica. When they are changed, as in one of the bourgeoises, to one-fifth, three-tenths, four-tenths, five-tenths, six-tenths and seven-tenths, the proportions of the letters do not agree with those of the smaller size. If the former were well cut, the latter are not; but, taking small pica with one-seventh, two-sevenths, three-sevenths, four-sevenths and five-sevenths, an entirely new set of proportions must be adopted. The nice gradations cannot be preserved. In the nonpareil the l bears proportion to e, n and w respectively as 2, 3, 4 and 5; in the small pica it is in the ratio of 2, 3, 3 and 4.

A consideration of these facts has induced others to propose a modification of the system, by which more sizes are given: Taking the thinnest letter, as an l, at a four-em space; the t at a thick space; two other sizes between this and an en quadrat; an a as an en quadrat; two sizes a little below and a little above a three-em space and a five-em space for such letters as b, p, u and k; then something larger for a w, and something larger yet for an m. Thus there would be nine sizes, besides a still larger one for Æ. The sizes named would thus compare with those in the Benton plan, his nonpareil being taken as his standard: l, 10, 10, 11, 11; t, 15, 12½, 12, 13; r, 15, 14, 15, 15; c, 15, 16, 16, 16; a, 20, 17, 17½, 17; d, 20, 19, 20, 20; k, 20, 20, 22, 20½; w, 25, 27, 28½, 27½; m, 30, 29½, 29, 29. The first figure in each subdivision is Benton's. the second Farmer's, the third Bruce's and the fourth MacKellar's. James E. Munson of New York city, who has given much study to the subject, suggests that there shall be eight sizes of alphabetic letters; the unit is to be one-eighth of an em; the letter t is to be cast on a three-unit body, and the other letters on larger sizes, m being on an eight-unit and W and Œ on a ten-unit body.

Unit Lines.—Ruled lines in blank-books intended to form a division between figures representing different commercial values.

United States.—Printing in the United States began in Cambridge, Mass., the workman being Stephen Daye, and the principal promoter being the Rev. Joss Glover, who set sail with Daye and the printing material from England in 1638, but unfortunately did not live until the voyage was completed. Glover's wife afterwards married Henry Dunster, the President of Harvard College, and he assumed the management of the press, as it was attached to that seat of learning. The first thing printed by him was the Freeman's Oath, in 1639, and the first book was the Psalms in Metre, in 1640. Matthew Daye printed a book in 1647. Samuel Green succeeded Stephen Daye, whose last known imprint was in 1649, although he lived for many years after. Green continued in printing until his death in 1702, his chief work having been the Indian Bible. No printing was done in Cambridge for many years after his death, as Boston was a much more convenient place. John Foster was the first Boston printer, beginning work there in 1676. He was succeeded by Judge Samuel Sewall and James Glen. Samuel and Bartholomew Green were soon after employed there, the latter continuing until 1732. Philadelphia had the first printing office south of Boston, William Bradford beginning there under the patronage of the Friends in 1685. Becoming involved in a religious quarrel in that city, and finding residence there no longer pleasant, Bradford removed to New York, where he set up business in 1693. The press in Philadelphia was suspended for several years, until it was again begun by Reynier Jansen in 1699. The most noted name in the early history of printing in New York, next to Bradford's, is that of Zenger, who was arrested for libeling the Government, but after many months of imprisonment was released, the jury claiming the right to interpret both the law and the facts. The list of towns which had begun printing before the Revolution is as follows: Cambridge, Mass., 1639; Boston, Mass., 1676; Philadelphia, Pa., 1685; New York, N. Y., 1693; New London, Conn., 1709; Annapolis, Md., 1726; Woodbridge, N. J., 1727; Charleston, S. C., 1731; Newport, R. I., 1732; Willlamsburg, Va., 1729; Germantown, Pa., 1736 or 1737; Ephrata, Pa., 1746; Lancaster, Pa., 1751; New Haven, Conn., 1754; New-Berne, N. C., 1754; Baltimore, Md., 1755; Portsmouth, N. H., 1756; Wilmington, Del., 1762; Providence, R. I., 1762; Savannah, Ga., 1762; Wilmington, N. C., 1764; Hartford, Conn., 1764; Salem, Mass., 1768; Burlington, N. J., 1770; Albany, N. Y., 1771; Norwich, Conn., 1773; Newburyport, Mass., 1773; Exeter, N. H., 1774; Worcester, Mass., 1775.

An extract from some Virginia documents would show that some one was carrying on printing there in 1682, and an imprint has been discovered dated St. Mary's, Md., in 1689. It will be seen from the above list that printing was carried on, or had been carried on, in twenty-six towns of the colonies before 1776, these towns being distant from each other an average of sixty miles. The press farthest inland was that at Albany, one hundred and fifty miles from New York.

When the Revolutionary struggle ended and settlements began West of the Alleghanies it was not long before Pittsburgh, Lexington and Cincinnati became familiar with the printing art. The annexation of the Louisiana territory was not immediately attended by any change, for the population was very sparse, and the growth of the region west of the Mississippi did not really begin until ten years after Jefferson's death. The annexation of Texas, the war with Mexico, and the discovery of gold mines in California drew attention to that rich region, and the passage of the Kansas and Nebraska bill threw open a vast territory to the settler. In each the plow has been preceded or attended by the press and the stick. Much of the best printing in the Union is done in towns which within the memory of middle-aged men had no white men within hundreds of miles of them. The printers of the Union, who numbered at the beginning of the century not over fifteen hundred, have now been multiplied until they reach one hundred thousand, while the work turned out by them would have required by the old system from two to three times as many men as now labor at the art. They have doubled every fifteen years, while the population of the Union does not quite double in twenty-five. With printing a multitude of subsidiary trades have come up.

We have a detailed account of the growth of the art before the Revolution, owing to the pious care of Thomas; but there has been no subsequent historian. Whatever is known must be picked up from thousands of books, pamphlets and fugitive publications. At the beginning of printing here there had been no advance in the art for over a century, with the single exception that the press of Blaew embraced some features which had not previously been known. The colonial printer labored under peculiar difficulties. He had no type-founder near by; paper mills were few and far between; it was difficult to send the productions of his press to any distance from home, and, so far as it was done at all, could be effected only by post-riders or by the masters of sailing vessels; money was scarce and hard to send; and that which renders the press of to-day so powerful, the collection of news, was unknown. When the journals of that day could find nothing in the London newspapers with which to fill their columns they took extracts from any book of polite literature, or even inserted a chapter of the Bible itself. Boston did the most work. It had more printers and booksellers for many years than Philadelphia and New York together, the fecundity of its presses being remarkable. "After 1760," Thomas remarks, "the quantum of printing done in Philadelphia and Boston was nearly equal." The first paper mill was near Philadelphia, as well as the first successful attempt to cast type. Both Philadelphia and New York were delayed in this respect in the beginning of their careers by the fact that a large number of persons in each town, or living close by, did not understand English. New York had been settled by the Dutch, that language continuing equal in importance to English until 1750, and there was a very heavy German immigration into Pennsylvania in 1710 and subsequent years. The Dutch language was printed in the State of New York as late as 1823, and German is still the native tongue of many Americans in Pennsylvania. The work done in the last century was the same kind of work which was executed in the provincial offices of England at the same time, neither better nor worse. It did not compare, except in rare instances, with the best work of London. The paper was rough and uneven; it was rarely really white; the ink—made by the printers themselves—was poor; and the type was well worn before it was thrown away. There is a great difference, however, between the work done for Rivington, Gaine and Hall just before the Revolutionary War and that executed in 1730 or 1720. Franklin's work is usually considered the best, and his Cato Major his finest production. Improvements in the art did not begin immediately after the war; the people were too poor; but with the advent of Mathew Carey, a more adventurous bookseller than had before been known, and the setting up in business of William Fry, affairs began to change. The latter did the great epic of America, Barlow's Columbiad, in large type and with all of the luxury possible. The engraving of steel plates for illustration became common; Anderson learned how to cut on wood; and American type was cast. The first permanent foundry was that of Binny & Ronaldson, in Philadelphia. Printers could buy new type whenever they wanted it after 1796. Sower, in Baltimore, supplied his region, while Elihu White afforded facilities to the citizens of New York after 1810. Stereotyping, brought hither in 1813, increased rapidly. Ten years after more was done in this line in America than in England. Iron presses, invented by Lord Stanhope about 1800, but altered to suit American requirements, came into use about 1817, and in twenty years had driven the wooden presses completely out. This was a great step forward, and the introduction of composition rollers in 1826 and 1827, the necessary complement of the iron presses, perfected this improvement. Paper was made by the Fourdrinier machine about this time, being both larger and more even than before, and muslin binding was introduced in 1830. Ink was regularly manufactured both in New York and Philadelphia after 1805, and in New York there were two ink-makers a dozen years later. Incessant activity then characterized the American press and publishers, but one of the greatest benefits to the art did not then appear to have any relation to it. Internal communication and the relation of dealers in one town to those in another greatly improved. Highways had been laid out; steamboats plied the waters; and another great force was exerted to spread intelligence. The railroad came into use, and then letters, packages and messengers could be sent hundreds of miles in a day. In 1800 a journey to Cincinnati and back took seven weeks; in 1850 it took three days. The post-office laws were amended, so that greater freedom was allowed to the mails; but the crowning help to the spread of intelligence was the invention in 1844 of the electric telegraph, by which distance was annihilated. There was, too, during the sixty years which elapsed between the Declaration of Independence and the arrival of the first cheap newspaper a vast increase in the intelligence of the people. Common schools had been founded, colleges were instituted and special legal, divinity and medical schools were inaugurated.

The newspaper press had not increased in the same ratio as the mechanical arts which entered into its manufacture. Whoever looked at the Courier and Enquirer, the Globe, the Albany Argus or the New Hampshire Patriot found much argument, some wit and a good deal of abuse; he found very little news. This was to be altered. The penny newspapers, which sold in the streets or wherever the vendor might be, were begun in 1832. Their success was prodigious. The great editions required faster presses and more of them, and their publishers, first of all printers, became rich and had money to spare for experiments. Presses far swifter than a hand-press had been put up in the United States in 1823 and 1824, but it was not until one was imported from Great Britain two years later that an approximation to a thousand an hour was attained. American mechanics set at work to reproduce such machines, with those modifications which experience showed to be desirable, and it was fortunate that the chief firm which then entered upon this work was so highly gifted with qualities which command success. From the time that the first half-dozen power-presses were made this country has never been inferior to any other in the quality or performance of its printing machinery. About this time, too, was discovered the power platen-press. Since 1830 there has been little which is startling to record. Towns have been founded in the wilderness and have become great centres, and newspapers which spend more money yearly than all of the newspapers in New York, Boston and Philadelphia together did half a century ago are published in them; improved machinery has been demanded and obtained. In book offices all kinds of improved appliances have been put in, such as metal furniture, iron imposing-beds and presses which can be depended upon to do the most exact work. In job offices, which were almost unknown during Madison's administration, can be found every labor-saving device known to man. The compositor has his choice of eight thousand kinds of type. The enumeration of late improvements embraces web presses, following type-revolving presses; electrotyping, especially adapted to cut work; papier maché stereotyping; the application of photography to make illustrations; dry printing; the extensive use of colors; and the printing of illustrations. Many of these processes were invented here; none have failed to receive improvement.

According to the last census the United States had twenty-seven cities possessing a population of one hundred thousand or more. Printing was introduced into each of these as follows:

New York, 1693; Chicago, 1833; Philadelphia, 1685; Brooklyn, 1799; St. Louis, 1808; Boston, 1676; Baltimore, 1773; San Francisco, 1847; Cleveland, 1819; Cincinnati, 1793; Buffalo, 1811; New Orleans, 1804; Pittsburgh, 1786; Washington, 1796; Detroit, 1809; Milwaukee, 1836; Newark, 1791; Minneapolis, 1849; Jersey City, 1848; Louisville, 1807; Omaha, 1855; Rochester, 1816; St. Paul, Minn., 1849; Kansas City, Mo., 1854; Providence, R. I., 1762; Allegheny City, Pa., 1830; Denver, Col., 1859.

In the volume of the printing business the order of the larger cities would be New York, Chicago, Philadelphia, Boston, St. Louis, Cincinnati and Washington, the last doing chiefly Government work. Very little is done in Jersey City, Newark, Baltimore or Allegheny City in proportion to their magnitudes. Among the small cities especially distinguished for the quantity of work turned out may be mentioned Cambridge, Mass.; Augusta, Me.; Springfield, Mass., and Hartford, Conn. Type-foundries are to be found in New York, Chicago, Philadelphia, Boston, St. Louis, Cincinnati, Baltimore, Cleveland and Buffalo. Those in other cities are really agencies. Plate printing is carried on in Boston, Providence, New York, Philadelphia, Washington, Chicago, Cincinnati, St. Louis and San Francisco. Books are chiefly published and sold in New York, Chicago, Boston, Philadelphia, Cincinnati and San Francisco. Lithography is practiced in all large towns, and so is electrotyping. If the place has less than fifty thousand population it is, however, generally too small to sustain an establishment devoted to this art. Printing-presses are made wherever convenient, but nearly all manufacturers have agencies or their principal house in New York or Chicago. Stationery goods are made and sold everywhere. Paper is made more or less in all parts of the Union. The latest statistics, as gathered by Howard Lockwood & Co. in July, 1893, showed that the total daily capacity for production of paper in pounds was 19,958,710. Book and news took 25 per cent., chemical fibre 11 per cent., manilla 10 per cent., straw-board 8 per cent., and wood-pulp 22 per cent. The total capacity for production was as follows:

PRODUCTION OF PAPER.

STATES.	Daily Capacity in Pounds.	STATES.	Daily Capacity in Pounds.
California . . .	104,000	New Hampshire .	925,600
Colorado . . .	114,000	New Jersey . .	417,200
Connecticut . .	497,600	New York . . .	4,761,750
Delaware . . .	155,480	North Carolina .	25,000
Georgia	37,500	Ohio	1,422,000
Illinois	763,280	Oregon	136,500
Indiana	1,127,000	Pennsylvania .	1,495,800
Iowa	125,000	South Carolina .	16,000
Kansas	59,000	Tennessee . . .	16,000
Kentucky . . .	66,500	Texas	16,000
Maine	1,957,500	Vermont . . .	620,700
Maryland . . .	333,200	Virginia	146,000
Massachusetts .	1,830,400	Washington . .	58,000
Michigan . . .	597,000	West Virginia .	269,000
Minnesota . . .	86,000	Wisconsin . . .	1,701,500
Missouri . . .	40,200		
Nebraska . . .	38,000	Total	19,958,710

It will be seen from this that paper is made only in thirty-two States of the Union; that of these eight produce only very small quantities, and that 72 per cent. of the supply comes from the States of Indiana, Maine, Massachusetts, New York, Ohio, Pennsylvania and Wisconsin. Of this New York furnishes 24 per cent., while the other States mentioned supply 48 per cent. Nearly two-thirds of the writing-paper is from Massachusetts. The percentage of increase since 1881 has been 275½ per cent., the whole capacity then being 5,315,400 pounds daily. Eight times as much wood-pulp is now made as then, eight and a half times as much wood-pulp board, seven and a half times as much chemical fibre, and four and a half times as much blotting. Newspapers and books require twice and a half as much, and nearly twice as much writing is done now as then. The population has probably not increased more than a quarter.

The increase in the number of newspapers has been remarkable. Almost every village of a thousand inhabitants has one newspaper, those of three thousand two journals, and of five thousand three journals. They also cover a great variety of special fields. As given in the last list newspapers are printed relating, among others, to advertising, colored people, selling-agents, agriculture, the order of American Mechanics, Anarchy, the order of Foresters, the order of United Workmen, architecture, the army and navy, art, hair-dressing, bee culture, the blind, book-keeping, book-selling, boots and shoes, bottling, brewing, building, building loan associations, butchering, cabinet-making, caps, carriages, carpets, catering, chemicals, children, clothing, coal, college fraternities, order of Chosen Friends, commerce, confectionery, crockery, cooking, cycling, dairying, dancing, the deaf and dumb, decorating, dentistry, the drama, drugs, dry goods, education, electricity, electrotyping, engineering, entomology, the Epworth League, exporting, express business and fancy goods. The number of subdivisions is over two hundred.

The newspapers and periodicals published in 1893, according to George P. Rowell & Co., were as follows:

NEWSPAPERS.

STATES.	Daily.	Weekly.	Monthly.	Total.
Alabama	18	167	21	213
Alaska	....	3	1	4
Arizona	8	25	1	35
Arkansas	12	184	22	221
California	96	432	85	639
Colorado	33	224	29	298
Connecticut	42	115	36	205
Delaware	6	31	7	46
District of Columbia	3	34	19	67
Florida	16	108	10	137
Georgia	25	242	45	317
Idaho	5	47	3	58
Illinois	133	1,067	267	1,560
Indian Territory . .	1	28	2	32
Indiana	109	522	98	749
Iowa	58	776	85	951
Kansas	44	642	60	759
Kentucky	26	228	30	302
Louisiana	14	142	17	176
Maine	15	105	59	192
Maryland	17	148	46	224
Massachusetts . . .	75	361	217	708
Michigan	57	568	90	750
Minnesota	36	422	76	553
Mississippi	7	153	13	179
Missouri	79	663	118	905
Montana	12	66	8	90
Nebraska	32	540	55	645
Nevada	9	15	....	26
New Hampshire . .	15	83	32	135
New Jersey	50	263	67	400
New Mexico	7	48	3	59
New York	183	1,131	650	2,131
North Carolina . .	19	168	32	231
North Dakota . . .	9	118	9	139
Ohio	139	780	194	1,190
Oklahoma	7	53	4	66
Oregon	15	144	25	194
Pennsylvania . . .	178	918	275	1,478
Rhode Island . . .	15	45	17	83
South Carolina . .	8	93	15	128
South Dakota . . .	16	226	22	269
Tennessee	20	222	40	293
Texas	52	561	45	678
Utah	9	35	12	71
Vermont	4	59	18	86
Virginia	32	189	57	297
Washington	20	192	29	253
West Virginia . . .	13	138	12	166
Wisconsin	51	456	46	575
Wyoming	5	37	1	43
Totals	1,885	14,017	3,125	20,006

The number of tri-weeklies was 31; semi-weeklies, 237; bi-weeklies, 85; semi-monthlies, 349; bi-monthlies, 78; and quarterlies, 229. The percentage of each of these classes is as follows: Dailies, 9.5; tri-weeklies, .015; semi-weeklies, 1.04; weeklies, 70; bi-weeklies, .04; semi-monthlies, 1.75; monthlies, 15.7; bi-monthlies, .04; and quarterlies, 1.01.

Universal Press.—A well-known job press, manufactured by Merritt Gally.

Unlead.—To take out the leads from leaded matter.

Unlock.—To unfasten a form with mallet and shooting-stick, or in any other way.

Unopened Edges.—Applied to books the edges of which have not been opened.

Unsheet.—To withdraw the interleaving sheets between printed work which have been placed there to prevent set-off.

Unsized Paper.—Paper made entirely without size, and consequently very absorbent and adapted for plate-printing.

Upper Case.—The upper of the two trays in which the type is contained with which the compositor works. It contains the small capitals, the capitals and the reference-marks.

Upper-Case Sorts.—Those letters which are contained in the upper one of the pair of cases.

Upper Hand.—When the spindle goes soft and easy the pressmen say it goes well upper hand or above hand; but the contrary if it goes hard and heavy.

Upright.—A page or job set or cut to an upright size—the reverse of oblong.

Utah.—A Territory of the United States which has long been settled. Printing began in Salt Lake City in 1850. It is now carried on in twenty-six towns, and the number of newspapers is 71, 9 being daily and 85 weekly. In 1860 there were 2 newspapers, in 1870 10, and in 1880 22. Salt Lake City is the principal town and Ogden the next largest.

Utica.—This city, in the State of New York, has practiced printing since 1798, when a newspaper, previously published in Whitestown, was removed there and became the Whitestown Gazette and Cato's Patrol. The continuation of it is still published as the Utica Herald. Among the noted printers who have carried on business in Utica have been William Williams, De Witt C. Grove and Robert Roberts. Much Welsh printing is executed there, many Welshmen settling in that neighborhood at an early date, and it has also been a considerable music-printing centre. There are now issued there three daily and seventeen other periodicals.

V

V THE twenty-second letter of the alphabet. It is about the thickness of an en quadrat in the larger sizes of type, but in the smaller sizes it is thicker. The capital V has a close resemblance to the lower-case v. The Romans had two different characters for the small letters u and v, but the capital V was common to both. When printing was introduced these distinctions, which had not been closely observed by the scribes and copyists of the Middle Ages, were confounded, and capital U's and capital V's, with their respective small letters, were interchangeable. V, as a numeral, signifies five; with a dash over it, 5,000. V. R. with the Romans stood for uti rogas; V. D. D. for voto dedicatur; V. G., verbi gratia; V. L., videlicet. In modern law Latin v. or vs. stands for versus, against; and in references v. stands for vide, see. In music V is used for the abbreviation of the word violin, and when written double implies both first and second violins. V. S. are the initials for the Latin verte subito, or, the Italian volti subito (turn over quickly).

Vacat (Ger.).—The page of a book on which there is no printing.

Valentine.—A poetical or prose effusion sent on February 14, or St. Valentine's Day, by one lover to another. This was the original idea; but for very many years valentines have been sent by either sex to any person whatever. They are nearly always illustrated, the cheapest having the poorest engravings now known, but many of them being works of art. The custom of sending these missives is dying out in the United States.

Vallee's Elastic Roller Gum.—A composition much used twenty-five years ago for making rollers. It could be employed sooner than glue and molasses, and it had such tenacity it was impossible to tear it.

Vallette, Eugene, president of the International Typographical Union in 1864, and a man of very high character, was born in Philadelphia in 1817. He was for a long time employed in Fagan's establishment as proof-reader, and filled many other stations of responsibility. He prepared an Historical Sketch of the Philadelphia Typographical Society, of which he had been president, which was published in the Printers' Circular in 1867 and 1868. He represented Typographical Union No. 2 twice in the National Union, and as president of the International Union succeeded John M. Farquhar and preceded Addis M. Carver. Mr. Vallette died in Philadelphia on May 26, 1887.

Vantage.—When a white page or more happens in a sheet the compositor calls that vantage; so does the pressman when a form of one pull comes to the press.—*Stower*. Obsolete.

Vantaggio (Ital.).—A galley.

Varnish.—A resinous liquid employed very largely in making printing-inks. For the better qualities linseed-oil is used, and for the cheaper rosin-oils. The coloring matter which shows in printing-inks is a solid which has been reduced by grinding to the finest and most impalpable particles. When this comminution is completed the pigment is mixed with varnish in greater or less proportions. This holds it, enables it to be still more finely divided, secures its retention upon the rollers and the type, and causes its adhesion to paper. After thus being applied the varnish oxidizes and dries, leaving the pigment and whatever color comes from the oxidization of the fluid firmly affixed to the page. In its liquid state varnish penetrates more or less into the paper and holds by its fibres, the tenacity continuing after being dried. Varnish is also used separately in printing-offices as a medium for diluting ink. If a certain ink is mixed with six or eight times as much varnish it will print as well as before, but shows very little color in the impression. It forms what is known as a tint. Against and upon this the full color may also be printed, thus giving the agreeable contrast of two shades.

Vaseline.—This material, derived from petroleum, has been successfully used in bindings to increase their suppleness. The leather seems to absorb it.

Veau (Fr.).—Calf; veau racine aux nerfs, tree-marbled calf, with bands.

Vegetable Parchment.—Paper chemically prepared to imitate parchment. It is formed by immersing ordinary unsized paper for a few seconds in sulphuric acid diluted with one-half to a quarter of its bulk of water, the solution being allowed to cool until it is of the temperature of the air, then washing it in cold water and removing any remaining traces of the acid by dipping it in a weak solution of ammonia. It resembles parchment in appearance, and is tough, translucent and almost impermeable to water.

Vellum.—A very smooth and delicate parchment, made from the skin of young animals. See for details under head of PARCHMENT.

Vellum Laid-Paper.—A laid writing-paper with a vellum surface.

Vellum Wove-Paper.—A name for wove writing-paper with a vellum surface.

Venice.—A city of Italy, the first in which great progress in printing took place. John de Spira began there in 1469. He died in 1470, and was succeeded by his brother Vindelin. Nicholas Jenson, one of the most famous of early printers, who had learned the rudiments of the art at Mentz, and had perfected himself at Weidenbach, went to Venice and in 1471 published the Decor Puellarum in Roman characters, followed by many other books. His reputation was very high. After his death, in 1482, his office passed into the possession of Torresani, and finally into that of Aldus Manutius, under whom and his immediate successors the previous reputation was not lost, but enhanced. Here Italic was first introduced, and here Greek printing first became common. It is said that by 1500 there had been two hundred and one master printers in Venice, and there had been two million of volumes printed. The city no longer maintains a commanding position in regard to printing, but much work is still done there.

Ventana (Sp.).—Hole in a page or handful of letters, caused by the type falling out from careless handling.

Vergé (Fr.).—Ribbed paper; papier vergé de Hollande, Dutch hand-made paper.

Verleger (Ger.).—The publisher.

Verlegervereine (Ger.).—Publishers' associations existing in many cities, as, for instance, those at Leipsic, Berlin and Stuttgart, formed to fix prices, regulate trade and determine on extending credit, &c.

Vermilion.—A deep red pigment used in printing, and the strongest known in the early ages. It is a sulphuret of mercury, easily decomposed if brought into prolonged contact with certain metals. When liberated the mercury combines with the metal, that most easily attacked by vermilion being copper and the resulting sulphuret being black. Consequently it cannot be used with electrotypes, unless they have first been covered with steel or nickel, upon which mercury has no effect. Vermilion is often adulterated with minium, red oxide of iron and ochres, but the adulteration can be easily detected, as pure sulphuret of mercury sublimates without leaving a deposit.

Vermont.—Printing was introduced in Vermont, at Westminster, in 1780. The next year a newspaper was begun there, called the Vermont Gazette, by Spooner & Green. In 1785 another started at Bennington, and the same year one at Windsor. Other early printing towns were Rutland, 1792; Fair Haven, 1795; Brattleboro, 1797; Putney, 1797; Peacham, 1798; Vergennes, 1798; and Randolph, 1800. The total number of newspapers and periodicals published in 1810 was 14; in 1840, 30; 1850, 35; 1860, 31; 1870, 47; 1880, 82; and 1893, 86. In 1880 there were 5 daily and 77 other periodicals, and in 1893 4 daily and 82 other periodicals. Burlington and Montpelier are the chief printing towns.

Vernis (Fr.).—Varnish.

Versales (Sp.).—Capital letters.

Versalien (Ger.).—Capitals.

Versalitas (Sp.).—Small capitals.

Versicle.—A sign thus: ℣; used in prayer-books and other religious works.

Versiculo (Sp.).—The sign ℣, or versicle, used in breviaries, &c.

Verso.—The versos are odd pages of a book; those which back upon the even page.

Vespasian of Florence (Vespasiano di Bisticchi), the last publisher of manuscript books, was born in 1421. He carried on a very extensive business, and was very solicitous that everything he sold should be complete and accurate. He assisted in forming the Laurentian and the Vatican libraries. He was also an author, having written a book upon Illustrious Men and another upon Worthy Women.

Victory Machine.—A newspaper machine manufactured in England which prints from the reel and has cutting and folding appliances attached.

Vienna.—The capital of the Austrian Empire and one of the great cities of the globe, where printing was introduced in 1482. The first Viennese printer is not known. The present distinction of Vienna as a printing centre is largely due to Alois Auer, formerly the director of the Imperial Printing-Office. This establishment began in 1804 under Vincenz Degen. In 1815 its ownership was transferred to the government. It introduced a steam-power press in 1836, but in 1840, when Auer became the manager, its work was poorly executed, and its material, although considerable, was badly chosen and kept. Auer had been bred as a printer, but at the time of his appointment was a professor of the Italian language. As soon as possible he introduced new machinery and new processes, cast up the old type, which amounted to 63,300 pounds, and turned it into new faces, with bodies regulated according to the point system. His punch-cutters were employed for years on the preparation of new punches and in making Oriental characters. Lithography was executed much better and a much greater variety of work was performed. When he began his labors in this establishment the total number of hands was 115. In 1845 the workmen were 260 in number, and in 1850, 868. It has since become much larger. The quality of the work also is high and has affected that turned out elsewhere.

According to statistics compiled at the beginning of 1881, there are in the Austrian capital 220 letter-press, 125 lithographic and 20 copperplate printing-offices; 26 type-foundries, 32 xylographic establishments, 189 engravers, 86 dealers in printing machinery and other material, and 676 publishers, bookbinders, &c. The number of newspapers published in Vienna is 540. The printing trade would thus seem to have developed very largely during the past half century, for in a gazetteer now before us it is stated that the number of printing-offices fifty years ago was below twenty-five and that of booksellers less than thirty.

Vigesimo-Quarto.—The bibliographical term used for 24mo.

Vignette (Fr.).—A small engraving with ornamented borders; so called because originally applied to ornamented borders in which vine leaves and tendrils were used; a capital letter in ancient manuscripts ornamented with vine branches or tendrils.

Viñeta (Sp.).—Combination border or flowers; a small engraving.

Viñetero (Sp.).—Case for combination border.

Virginia.—Printing was introduced into this state in 1729 by William Parks, an Englishman, who set up a press at Williamsburg, the first book being a volume of the Laws of Virginia. He received £200 annually from the colony as public printer. In 1736 he began the Virginia Gazette, which was for a long time the only journal in the Dominion. Parks embarked for England in 1750, but died on the voyage. The paper suspended that year, but in 1751 it began again with the same title. Other newspapers were begun in that town before the Revolution, but only one elsewhere, that being at Norfolk in 1775. The Alexandria Gazette was published at Alexandria in 1800, and in Richmond in 1804. The total number of periodicals in Virginia in 1810 was 23; in 1840, 51; 1850, 87; 1860, 139; 1870, 114; 1880, 194; and 1893, 297. In 1880 there were 20 daily and 174 other periodicals, and in 1893 32 daily and 265 other periodicals. The census of 1860 includes West Virginia, which has since been divided from it. The chief town for printing is Richmond, the capital; Alexandria, Petersburg, Norfolk, Danville and Roanoke have each a fair trade.

Virgola (Ital.).—A comma.

Virgolette (Ital.).—Quotation marks.

Virgule.—The French name for the comma. The point-virgule is the semicolon.

Virgulillo (Sp.).—Any mark placed over a letter or word. The apostrophe is sometimes so called.

Visiting Cards.—Cards used by ladies or gentlemen without having an address upon them—distinct from address cards.

Visorium.—A guide to hold copy; also known as visorum. In either form it is little used.

Vitela (Sp.).—Parchment; papel vitelado, parchment paper.

Vokale (Ger.).—Vowels.

Volado (Sp.).—Superior letter or figure. (Also called superior.)

Volador (Sp.).—A strip of card pasted to the tympan sheet to prevent the printed sheet from flying off when the frisket is raised.

Volandera (Sp.).—Slice of a coffin-galley.

Volant.—With prints, those slightly pasted or hinged at one edge, so that the backs may be readily scrutinized. The word is French and signifies "flying."

Volante (Sp.).—Fly-wheel.

Volar una Letra (Sp.).—To use a letter of a smaller size when those of the font used have run short.

Volta (Ital.).—The second side; the reiteration.

Voltare (Ital.).—To turn for sorts.

Voltare la Casta (Ital.).—To turn the heap of wet paper so that the moisture may be more equally distributed through the pile.

Voltear (Sp.).—To turn the paper, where both sides are printed from one form. Tirar á la voltereta, to work and turn.

Volume.—A single book. The word is derived from the Latin volumen, rolls or scrolls of parchment or papyrus, which were connected by a thong or cord, and which were often highly ornamented.

Volver (Sp.).—To turn for a letter; also to put in the wanting letter afterwards.

Voyelle (Fr.).—Vowel.

Vorrede (Ger.).—Preface.

Vulgate.—The colloquial name for the Latin Bible, which is properly called Biblia Latina, Vulgatæ editionis. The Douay Bible, the Catholic English version, is translated from the Vulgate. This is the revision prepared by St. Jerome.

W

W THE twenty-third letter of the alphabet. It is one of the two thickest letters, both in the lower case and the capital, approximating to the thickness of an em. In the Latin languages it does not occur, except in foreign names and in a few words borrowed from English and German. In Italian it is classed as a double letter along with æ and œ, and this its name indicates in English. In the first folio of Shakespeare, printed in 1623, William is spelled VVilliam, and this doubling of the V frequently happened for many years after.

Waddey, Everett, a printer and stationer of Richmond, Va., was born in Thomasville, Ga., on March 25, 1853. His father and mother both died before he was four years of age, and immediately after this he was taken by his relatives to Virginia. He began work as a telegraph messenger when eleven years of age, and during the winter of 1864–5 was a courier for General William H. Stevens, C. S. A., and chief engineer of the fortifications around Richmond. At the end of the Civil War he attended a grammar school for two sessions, and at the age of fourteen entered the office of Shepperson & Graves, in Richmond, as an apprentice to the printing business. After going through the various departments he worked at the trade as a journeyman for several years, but in 1876 left it to go into the stationery business as a salesman. In 1878 he entered the employment of J. T. Ellyson, and traveled for that house and its various successors until 1883, when he purchased the interest of his associates in the concern of Yancey, Waddey & New, and has since conducted it in his own name. Its business embraces printing, stationery and bookbinding. This business was incorporated in 1890 as the Everett Waddey Company, stereotyping being added to the other branches. He has been prominently identified with the Typothetæ since its organization in 1887, having been mainly instrumental in organizing the Richmond Master Printers' Association in that year, which subsequently became the Richmond Typothetæ. At the second annual convention of the United Typothetæ of America, held in New York in 1888, he was elected corresponding secretary, to which office he was unanimously re-elected until the fifth annual convention, held at Cincinnati in 1891, when the offices of recording secretary and corresponding secretary were consolidated under the title of secretary, with Mr. Waddey as the incumbent. He declined to be chosen again at the Toronto convention in 1892, but the incumbent resigning, he was asked to complete the term, which he did. At its expiration he was elected again, and is still filling the office.

EVERETT WADDEY.

Wade, Horace Dwight, was born at Chester, Mass., on April 3, 1818. His habits as a boy were studious, and his father intended to fit him for a professional career; but the sudden death of the latter interfered with these plans, and the young man entered the dry-goods business at Hartford, Conn. Not liking his position or the business, after a few years he returned to his home, where he entered into the study of pharmacy and became a druggist and chemist. He established himself in 1841 at Rochester, N. Y., where in 1848 he conceived the idea of adapting rosin-oil to the manufacture of printing-ink as a substitute for the more expensive linseed-oil. While thus experimenting he convinced himself that a profitable field lay before him in this direction, and in 1850 he disposed of his drug business and removed to New York, where he founded the firm of H. D. Wade & Co. and devoted his chemical knowledge and skill to the development of the business in all of its branches. Prior to this there were few colored inks in the market, most printers being compelled to mix their own as required. To the perfection of these inks Mr. Wade gave special attention, and soon supplied the market with readily workable inks of the ordinary hues, as well as the then unknown carmines, purples and other brilliant colors. After an exceptionally successful business career he died at his home in Brooklyn on December 3, 1873, being succeeded in ink manufacture by his son, William D. Wade, who had been for some years associated with him in the active management of the business.

HORACE DWIGHT WADE.

Wafer.—A thin, round, glutinous piece of material used to seal letters and for official impressions or seals. Its employment has been superseded to a great extent by gummed envelopes.

Wages.—The amount received for work. In the printers' trade the highest wages paid are in the United States, and the lowest in India and China, where a man can be employed for ten cents a day. Wages are determined partly by the length of time necessary to acquire a trade. Occupations which can be learned in six months or a year are always poorly paid, while those which require six or seven years demand a much higher compensation. Taking the expectation of life of two boys of fifteen at thirty-seven years each, one of these boys may enter a trade which is learned in one year, while the other apprentices himself to another which requires seven. The first will have thirty-six years to be employed as a journeyman, and the other only thirty. Yet it is probable that the latter will receive for the shorter time one-half more than the other for the longer; or that if the former earns twelve dollars a week the latter will get nineteen or twenty. In trades requiring the same degree of intelligence and time to learn, that which demands a strong body will have the preference in wages over the other. Thus molders receive more than shoemakers. Wages are also affected by hazard, a powder-mill operative receiving more than one in a flour-mill. The competition of unskilled labor affects wages. Bakers can never receive high pay, because if bread is sold above its ordinary level women immediately begin baking for their own necessities. A calling which requires more than ordinary intelligence, or which demands special skill or a special organization, is better paid than another which does not require such qualifications. Yet these qualifications must be to a large extent innate. Were a classical education so common that every third man knew Latin and Greek, classical teachers would receive no more than ordinary English teachers. In many occupations which almost every man could learn, and which many men do learn, there is a great discrepancy in payment. Bookkeepers can be obtained for less than the wages of a day laborer, but they also receive salaries higher than any skilled mechanic. The difference between them is vast.

In determining wages an employer usually gives the price which is paid by his competitors in trade. He does not give more, for he would therefore be obliged to add to the price of his goods; nor does he give less, for he is consequently deprived of the best workmen. They will not work for less than maximum wages, and it is necessary for any one who carries on an establishment of size to have many first-rate men. Wages in any town have a tendency to seek a level, those in one occupation receiving about the same as those in another, with the modifications suggested above. As prices have usually been in the United States, the wages of journeymen in good trades in large cities have been a little over three times the price of board in the same places; women of experience get about twice the cost of their board, which is less expensive than that of men; and boys in their first year receive about two-thirds the value of a man's board; but these prices are affected by competition in other towns. The work on ordinary shoes must be executed in Brooklyn at about the price paid in Lynn, notwithstanding living is dearer; and furniture workers in Philadelphia can receive very little more than is paid in Grand Rapids. Manufacturers frequently remove their establishments to other places where there can be a saving in labor and other departments. In New York the wages of compositors are $18 a week and of pressmen $20. These are rather more than twice the wages of London, which is the only city doing more printing. Substantially the same prices are paid in Cincinnati, Chicago and St. Louis, and a very little lower are given in Boston, Baltimore and Philadelphia; $15 are paid in Albany, Buffalo, Providence and many other towns; $12 in Harrisburg, Wilmington and dozens of other places; $11 at Rutland, Vt., and some ten other towns; $10 are paid in some, and some give only $9. This was the rate in Lancaster, Pa. The highest figures are at Galveston, Tex., where the rate is $20; Sacramento, Cal., $21; Denver, Col., $20; Portland, Ore., $21; Washoe, Nev., $28; Helena, Mon., $21; and Anaconda, Mon., $24. The lowest piece price recorded in the report of the International Union, from which these figures are taken, is 20 cents a thousand ems; many pay 25 cents; the small cities usually range from 28 to 33, the highest day rate being 65 cents at Washoe. In New York the price ranges from 37 to 43, and in the other large cities does not vary much from this. The highest on morning papers, excluding the Rocky Mountain and Pacific Slope towns, is 50 cents a thousand, which is paid in New York and several other places, but some large cities give no more than 40. Women are employed in many places in the United States, hardly ever receiving as much as men, and sometimes a great deal less. In Auburn, N. Y., where a number are employed, they get 15 cents a thousand. In country offices journeymen are paid between $9 and $12, and composition is oftenest paid for at 20 cents a thousand. In the West, where living is cheap, journeymen are sometimes hired at $6 a week. There is as yet no settled price for typesetting-machine operators, and although the cost of production of newspapers has been lessened by their employment, and their operators come into rivalry with hand compositors, the wages of the latter have not so far been lessened in consequence.

Wages in the United Kingdom for book and job men are as given here, being a little less than on daily papers, but about the same as on weekly papers :

London, 38s.; Liverpool, 35s. 6d.; Manchester and Salford, 35s.; Sheffield, 32s.; Dublin, 35s.; Edinburgh, 30s ; Glasgow, 34s.; Leeds, 32s.; Belfast, 30s.; Birmingham, 33s.; Bradford, 34s.; Bristol, 30s.; Nottingham, 30s.; Oxford, 30s.; Plymouth, 27s.; Wolverhampton, 31s. 6d.; and York, 29s. These are all towns of considerable size, doing much printing. But in many towns the wages are much less. They are in Bath, 28s.; Carlisle, 27s.; Coventry, 28s.; Enniskillen, 20s.; Galway, 23s.; Kidderminster, 26s.; Sligo, 20s.; and Waterford, 20s. It does not appear that this is the lowest paid, but the lowest paid in towns where there are societies of workmen (unions). What is paid where there are none is unknown here. Twenty shillings is $4.86 ; twenty-five shillings, $6.07 ; thirty shillings, $7.29 ; thirty-five shillings, $8.50 ; and forty shillings, $9.72. The highest piece rate on book-work in London is for solid manuscript—7d. per thousand ens, or 28 cents a thousand ems, on brevier to English, inclusive ; leaded reprint is worth 6d., or 24 cents per thousand ems. The rates on London morning dailies are 9d. on minion and brevier, and 10d. on nonpareil, or 36 and 40 cents a thousand ems. The hours, generally speaking, throughout the United Kingdom are fifty-four, but they vary an hour or two.

On the continent of Europe wages are less than in England. In Berlin compositors receive $7.05 at the Government Office, while the commercial houses pay compositors $7.40, pressmen $7.40, and proof-readers $7.90. Leipsic gives compositors $6.05, pressmen $5.80, and foremen $9.75. In Dantzic compositors receive $5.10, pressmen $4.85, and proof-readers $5.80. Dresden gives compositors $5.80 and pressmen $5.30 ; Stuttgart, compositors $5.80, proof-readers $7.30, pressmen $6.05, foremen of composing-rooms $11, and foremen of press-rooms $8.75. The lowest wages in a large town in Germany is in Posen, in Prussia, where in the German offices compositors receive $4.64 and pressmen $4.40. Those employed in the Polish offices in that city obtain from $2.90 to $3.60 for a week of sixty-six hours.

In Russia seventy-two hours are worked. In St. Petersburg jobbing-hands get, with lodging, $20 a month ; hand-press workmen, $15 ; power-press men, $33 ; and feeders, $12. Wages are regulated generally by individual agreement. In Turin, Italy, printers receive about $4.80 a week. In Amsterdam, Holland, job compositors get $4.85 a week, book compositors $3.75, pressmen from $4.85 to $8, and proof-readers $7.30. Berne, in Switzerland, pays compositors $5.75 and pressmen $6 ; Basle gives compositors $5.75, press-feeders $2.90, and pressmen $6.25. In Vienna, Austria, newspaper compositors obtain $9.75, job-hands $5.75, pressmen $4.85, proof-readers $7.30, female feeders $1.70, and foremen $10. Seventy-two hours is the rule there. In Belgium seventy hours are worked. Compositors are paid $7, pressmen $8.60, women feeders $3.40, and proof-readers $8. In Antwerp compositors are paid $5.75, pressmen the same, and proof-readers $8.50.

Our figures do not extend to Paris, but give several other places in France. In the Department of the Gironde compositors on newspapers get $6.75, and in job offices $6.25. Pressmen receive from $6.75 to $9.50. At Marseilles the number of hours is seventy-two. Compositors receive $7.50, pressmen $6.05, and proof-readers $11. In Rheims newspaper and book compositors get $10.10, job-hands $7, pressmen $7.60, and foremen $11.50. The hours of labor are sixty-eight. In Rouen, with sixty hours a week, the rate for compositors is $6.50, feeders $4.85, and pressmen $7.80. In Denmark compositors get about $5.50, hand-press men from $5.50 to $6.75, power-press men from $4.85 to $8, proof-readers $7.25 to $8.05, and girls $2.10 to $2.45.

Wall-Paper.—In the Middle Ages hangings of cloth were placed upon the walls of buildings partly as an ornament and partly for warmth, as the edifices were seldom free from draughts. For the purpose of decoration paper was placed upon walls in China five hundred years ago, and when the Dutch and Portuguese first visited Japan they found that the natives manufactured a paper for this purpose which closely resembled leather. In Europe paper-hangings began to be manufactured early in the seventeenth century. The industry was carried on in England in 1748, but had been known in France for a long time before. The first advertisement of this material in an American newspaper was in 1737. Kalm, the Swedish traveler, remarks of New York in 1748 that the inhabitants do not seem to have any acquaintance with paper-hangings, as he saw none. The domestic manufacture began in America about 1765, as samples were then shown and highly approved. There were a number of factories in the United States in 1787. Before 1835 all goods were manufactured in square sheets, which required that they should be pasted together ; but in that year machinery was invented which admitted the use of continuous rolls of printing-paper. Since that time, either by hand or by machinery, all forms of mural decoration have been copied by wall-paper, whether wood, plaster, bronze, marble, metal, tapestry or silk. The business has steadily increased in magnitude. In 1840 the output of all the American factories was 2,000,000 rolls ; in 1850, 15,000,000 rolls ; in 1860, 30,000,000 rolls ; in 1870, 45,000,000 rolls ; in 1880, 65,000,000 rolls ; in 1888, 100,000,000 rolls. There are about twenty-five firms now in the business in the United States.

Walter, John, the founder of the Times of London, was born in 1739. He was in his fiftieth year when he began publishing, and had previously made a fortune as an underwriter at Lloyd's, afterwards losing it. In 1782 he became acquainted with Henry Johnson, a compositor, who had invented a system of casting whole words instead of depending upon single letters. In concert with Johnson he took out a patent for this improvement. In order to show that there was an economy in the use of logographs he brought out the first number of the Daily Universal Register on January 13, 1785. On January 1, 1788, the title of this paper was changed to the Times and Daily Universal Register. It had then four pages of four columns on each page, and until 1803 its circulation did not exceed a thousand copies daily. The latter part of the title was soon dropped. The Napoleonic wars increased its circulation, and Mr. Walter's son, also named John, who had a better idea of the importance of the press than his father, succeeded in increasing its circulation and influence. In 1814 it was printed by steam-power, being the first journal in the world which introduced machinery for this purpose. On January 19, 1829, it issued its first number of eight pages. It has steadily kept its position at the front of English newspapers ever since, paying large sums for news and employing the best writers of the day to comment upon what has thus been obtained. It has unearthed many frauds, and on the whole has been carried on with justice and moderation. The first proprietor, John Walter, died at Teddington on November 16, 1812, at about the time when the power-press was introduced. It was his powerful support which enabled König to persevere with his invention. His son, who was really the creator of the paper in its sense of to-day, lived until 1847. In his time occurred the denunciation of a concerted attempt to cheat the investors of Europe by false news and forgery. The plan had been devised by persons with large means and great familiarity with business. A tablet commemorating this exposure was set up in the Royal Exchange by the merchants and bankers of London. The paper increased under his management from a thousand circulation to twenty-five thousand, and from four small pages to eight large ones each day. About the period of his death Applegath's fast machine was adopted, which would turn out eight thousand copies an hour. The present chief owner, whose name is the same as that of his father and grandfather, was born in London on

October 8, 1818. He is an able man, and during his administration paper stereotyping was inaugurated, Hoe presses were put in, telegraphic wires were leased, and the Walter press was invented. This was the first English web press.

Walter Press.—A modern fast press, printing upon both sides of a newspaper from a web. It is the invention of the chief proprietor of the Times of London and two engineers on his staff. It was the first English press with stereotypes upon small cylinders, and requiring no feeders, and was the second press anywhere of this model, the first being the Bullock. The circular issued by the manufacturer says: "It is a perfecting-machine, printing on both sides at the rate of twelve thousand copies per hour, or from ten thousand to eleven thousand, including stoppages. Ample provision has been made for overcoming the difficulties of set-off; and as there are only four composition rollers used, and great care has been taken to make the cutting and delivery processes certain, the liability to interruption is reduced to a minimum. When changing from one reel to another the arrangements are such that the delay scarcely exceeds a minute, and the reels are kept as large as possible for convenient handling. The labor employed when the Walter press is in operation consists of two lads taking off, who suffice to inspect and count each sheet, and a striker to start the machine and look after the reels as they are unwound. One overseer can easily superintend two presses, capable of turning out, with six unskilled hands, perfected sheets at the rate of twenty thousand to twenty-two thousand per hour, stoppages included. With four of these presses, twelve lads and two overseers the Times is now printed at the rate of more than forty thousand copies per hour; that is, in less than half the time and with one-fifth the number of hands required by the fastest and best printing-machines previously in use. Moreover, layers-on, who are highly trained workmen and must be paid accordingly, are entirely dispensed with.

"Attention is invited to the extreme simplicity of the Walter press in all its details. There is nothing about it liable, with the usual ordinary care, to get out of order, while a practically unlimited rate of production is secured by the repetition of stereotype plates on additional machines to any extent that may be required. Thus newspapers of large circulation can be printed with maximum economy of time and labor, and with a freedom from risk in the process of production never before attainable. The waste of paper may be stated at one-quarter of 1 per cent.; but, in connection with the change of system, newspaper proprietors and printers will at once find that they obtain a knowledge of the kind of article which is supplied by their paper-makers—how much it counts and weighs per ream, and with what degree of uniformity it is produced—never before realized. There is also a considerable saving of ink, and in blankets and rollers. The exclusive use of stereotype plates releases the ordinary type from all wear and tear; so that a font lasts at least ten times as long as it could under the former system. It is hardly necessary to state that with the Walter press the register must be practically perfect." Nearly all that is here said applies to other web machines.

Walze (Ger.).—Roller.

Warehouseman.—One who takes charge of the sheets after they are printed and before they go to the binder, as well as receives the paper and other raw material and stows them away until they are needed.

Warped Cut.—A wood-cut twisted through dampness; generally caused by improper cleansing or storing.

Waschbrett (Ger.).—The trough.

Waschen.—To wash.

Wash Drawing.—A drawing generally produced with India ink, sepia or neutral tint and brush.

Wash-Out Process.—The manipulation in photo-engraving when the gelatine which has not been acted upon is washed out with hot water.

Washed Over.—In England, to wash over a form is the same operation which Americans call washing it. Why the "over" is used we do not understand.

Washing.—An old-fashioned term for jerrying or making a noise on an apprentice coming out of his time. —*Jacobi.*

Washing Forms.—Cleaning forms after printing. For this purpose nothing surpasses lye from wood ashes. It is clean, takes hold easily and is completely dislodged by the application of water. Common potash does not make good lye, as it is too dirty and uneven. Concentrated lye is generally used too strong. The compound should not be so strong that an accidental spot on the back of the hand would raise a red blister before it could be removed. A lye rather weak, but abundant in quantity, should be sought, and it ought not to be used over and over again with ink dissolved in it, as it often is. The brush can be used too much, thus injuring the type. A good deal of water is needed to remove the alkali. When the form is laid up, if the type is slippery the lye has not been properly washed off; and if the fingers become dirty in distribution it is from bad washing. An infallible indication that forms are not taken care of is a piece of alum in the men's cases. This is used to corrugate the skin on the fingers, so that the type may not slip away too easily. In some offices the lye is frequently allowed to penetrate the page. An eminent English printer recommends the use of a steam jet directed against the form when it is laid up in the trough for this purpose. He says that it loosens the grease and then blows it out of the very smallest interstices. This can be done without lye or brushes.

Washing Up.—Cleaning rollers or ink-slabs.

Washington, City of.—The capital of the United States; noted also as the town where the largest printing-office in the country is situated, and which is probably the largest in the world. In the offices inaugurated by the French, German and Austrian governments, while the investment may be as great and the display of some kinds of type, such as are employed in Oriental and other foreign tongues, is far greater, the presses turn out more sheets in Washington and more type is set there. With the exception of those establishments mentioned, one or two in France, such as that of Mame, and three or four in England, such as those of Waterlow and Eyre & Spottiswoode, there are no offices elsewhere to compare with it. The original printing of the United States Government was executed at Philadelphia and New York, the bills never being very large. After the removal of the capital to Washington, which took place in 1800, a larger amount of printing was required, but it did not exceed that of any of a dozen offices either in New York or Philadelphia until about 1840. Since then the increase has been very rapid.

Two weekly newspapers were published in Washington before the seat of government was removed there. These were started in 1796. Several others were undertaken when Congress began its sessions in that place, and also several book and job offices. In 1814 the government printing was executed by Andrew & George Way and Roger C. Weightman, who divided the work between them. Men then received ten dollars a week during the session and nine during the recess, with no allowance for overwork. As, however, nearly all Congressional hands were drawn from the neighboring cities, their expenses of travel were uniformly borne by those who engaged them. It is believed that at that time about thirty journeymen were engaged at work in Washington during the session. They were about equally divided between compositors and pressmen. William A. Davis became the government printer in 1815, having for foreman Peter

Force, later known as the annalist. Both were from New York. Later they became partners. The contract system, or the letting of the public printing to the lowest bidders, prevailed from 1804 until 1819. At that time it was resolved that each house should elect its own printer, the prices being fixed by the act. The succeeding printers were as follows:

House.—Gales & Seaton, 1819; Thomas Allen, 1839; Blair & Rives, 1840; Gales & Seaton, 1841; Blair & Rives, 1843; Ritchie & Heiss, 1845; Thomas Ritchie, 1846; Robert Armstrong, 1852; A. O. P. Nicholson, 1854; J. B. Steadman, 1857; Thomas H. Ford, 1860.

Senate.—Gales & Seaton, 1819; Duff Green, 1827; Gales & Seaton, 1835; Blair & Rives, 1837; Thomas Allen, 1841; Gales & Seaton, 1843; Ritchie & Heiss, 1845; Thomas Ritchie, 1846; Robert Armstrong, 1852; Beverly Tucker, 1853; Cornelius Wendell, 1856; William A. Harris, 1857; A. O. P. Nicholson, 1856; George W. Bowman, 1860.

House and Senate.—Cornelius Wendell and Charles Van Benthuysen, 1846; Thomas Ritchie, about 1850; Boyd Hamilton, about 1851.

Superintendents of Printing.—John T. Towers, 1852; A. G. Seaman, 1853; George W. Bowman, 1857; John Heart, 1859; John D. Defrees, 1861; Cornelius Wendell, 1866; John D. Defrees, 1867; Almon M. Clapp, 1869; John D. Defrees, 1877; Sterling P. Rounds, 1881; T. C. Benedict, 1885; Frank W. Palmer, 1889.

The position of Public Printer in the days when work was done on contract was always regarded as very valuable, and a number of the contractors retired with wealth. Up to 1839 work was executed under terms fixed by a joint resolution of 1819, but in 1843 were reduced 20 per cent. At that time the printing for the House of Representatives amounted annually to about $200,000. Between 1846 and 1852 it cost $3,462,655.12, an average per year of $577,109.18. No office in Washington at that date or afterwards was capable of doing all of this work, and it was finally resolved by Congress to purchase the establishment of Cornelius Wendell, then a government printing contractor, and have all of its printing executed by its own workmen. This was in 1860. The plot of ground occupied by Mr. Wendell covered a little more than an acre, and had upon it a printing-office and bindery 243 feet long and 61½ feet deep, four stories high, with several other smaller buildings. The whole establishment had cost about $180,000, and was purchased by the Government for $135,000. There were twenty-six printing-presses. An extension of 60 by 76 feet was made in 1865, and another in 1870 of 113½ feet, with the width of 61½ feet. Other large additions have been made since.

The work executed here includes composition, presswork, folding, binding, engraving and electrotyping. More than three thousand men and women are employed, and the annual expenditure is beyond $3,000,000. There are ninety power-presses. In one of the rooms is a font weighing 75,000 pounds, 60,000 of which were bought on a single order. From the method of appointment of the Public Printer and his assistants, politics alone being consulted, as high an average of performance, either in quality or quantity, cannot be found in this office as in private establishments. There are, however, many experts employed, and the work is good average work. In a recent visit there the writer could see nothing which had originated or was practiced there which was not known elsewhere, or which was better done than in other good houses. A daily newspaper is published by this establishment during the sessions of Congress, formerly known as the Congressional Globe, but now as the Congressional Record. The bound and unbound copies of the Globe, with its stereotypes and the building in which its office was, were purchased from the proprietors for $100,000 in 1878. The debates are reported by government stenographers, and the issue of any morning is supposed to contain a verbatim report of all proceedings of the previous day, no matter how extended. Single copies are therefore sometimes of great size. Many very large works have been issued here, as for instance the Census of 1880. Three hundred thousand copies are annually published of the Agricultural Report. A very large work is now going through the press, the Official Records of the War. This will extend to more than a hundred volumes, of about eight hundred pages each. The paper to print these will cost two hundred thousand dollars, the composition will equal two hundred and fifty million ems, and the number of books will be one million. Only a third is now done.

Washington possesses more than thirty other printing-offices and sixty-five newspapers, of which three are daily. As the Government pays very liberally for its work, the private printers approximating to its figures, it has been found more profitable by most individuals to send their orders to Baltimore, Philadelphia or Harrisburg, where work is cheaper.

A history of the Columbian Typographical Society, the printers' organization of Washington, was written in 1870 and 1871 by A. T. Cavis and E. McMurray. It has much valuable information, and there is a History of the Government Printing Office by R. W. Kerr, which is very incomplete.

Washington Jobber.—A small, cheap job press, made at Palmyra, N. Y.

Washington Press.—A hand-press, long known as the Rust press, after Samuel Rust, its original maker, which has been used for many years in the United States and is manufactured by several firms. For simplicity and accuracy it is difficult to see how any machine can surpass it.

Washington, State of.—A State of the American Union, on the Pacific coast, at the northwest corner of the United States. Printing has been carried on there since 1860. In 1880 there were 4 daily and 25 other journals; but in 1894 there were 20 daily and 146 other periodicals. The principal cities are Olympia, the capital, Seattle, Spokane and Tacoma.

Waste.—1. Surplus sheets of a book beyond the plus copies. 2. Spoiled sheets used for running up color on a press. 3. Part of the end papers and the blank leaves between the colored end papers and the book proper. These leaves should be part of the same lot of paper on which the book is printed.

Waste Cards.—Defective and rejected cards, usually sold at a cheaper rate than those which are perfect.

Waste Paper.—The paper which is imperfect or is injured in printing and must be thrown away.

Watchman.—A little flag of paper placed pro tem. in matter as composed, which serves to indicate the position of a foot-note.—*Jacobi.*

Waterlow, Sir Sydney Hedley, an eminent living English printer, was born in London on November 1, 1822. His father was a printer, doing business on a large scale. At fourteen Sydney Waterlow was apprenticed to the government printer, Thomas Harrison, for seven years, and after four of these had passed was intrusted with the management of the Cabinet Press at the Foreign Office in Downing street. On the completion of his apprenticeship he went to Paris and was employed on Galignani's Messenger. In 1844 he joined his father and brothers in the firm of Waterlow & Sons, printers and stationers. In 1863 and succeeding years he took a very prominent part in a company for erecting improved dwellings for the poor. At his own expense he built eighty tenements, and the company altogether now houses thirty thousand people. In recognition of Mr. Waterlow's services he was presented in 1884 with a set of plate, the Prince of Wales presiding. In 1866 he became sheriff, and in 1867 was knighted. He became a member of Parliament in 1868, and in 1872 was Lord Mayor of London. That year he established a convalescent hospital. He has received many honors from his own and foreign countries, and in 1872 was created a baronet. In the management of his business Sir Sydney takes an active part. It was begun by his father, James Waterlow, in 1810, as a law stationer. Lithographic and letter-press branches were added, and they now cast some of their own type, and also make the wood-letter, brass rule and furniture. Envelopes, bank printing and railway printing are the specialties. The firm, now Waterlow Brothers & Layton, employs about four thousand hands.

Water-Marks.—Marks made on paper in the mold or in the machine by wires which project a little above the other wires or are affixed to them, and which form a monogram or design. They make the paper a very little thinner in these places, and the impression serves to identify the mills where the paper was made or the printers for whom it was manufactured. A study of these is very interesting. The work of S. Leigh Sotheby, published in London in 1858, gives a vast number of fac-similes of old water-marks, collected with great care and research.

Watson, James.—A Scotch printer who published a History of Printing in Scotland. This work appeared in Edinburgh in 1713.

Watts, John, the earliest American stereotyper, was born in England. He was a brother of that Watts who was one of the earliest stereotypers in England, and was printer for Cambridge University. John Watts received a classical education, and in 1806 and 1807 was printing Greek and Latin authors in Philadelphia. He was in New York in 1809 as a printer and agent for foreigners. He began his experiments in stereotyping soon after, and in 1812 produced the plates for the Larger Catechism of the Presbyterian Church. It does not appear that he was successful in carrying on this art, for in 1816 he disposed of his place to B. & J. Collins. In 1819 Watts, who had in the meantime gone to Europe, introduced stereotyping "on the American system" in Vienna, Austria, assisted by his nephew, William Watts. He taught the art to Tauchnitz in Leipsic, Meisner in Hamburg, and Enschede in Holland. It is not known when he died.

Watts Press.—A press patented in 1820 which seems about midway between the modern cylinder-press and a hand-press. The frisket moved over the form, which was stationary, by means of slides at each side. Two inking-rollers were at the end, the frisket moving far enough so that they could completely cover the form. When the paper was put upon the frisket, that moved over the type, being prevented from touching it by springs which held it an inch above. A winch was then turned by the workman, which put in motion machinery for rolling the cylinder over the bed. Its weight was the only thing which gave an impression, being in this like our modern proof-presses.

Waver Rollers.—Rollers which distribute ink on the ink-table in a diagonal direction.

Wavy Rule.—Brass rule made with an undulating face, thus: ∿∿∿∿∿∿∿∿∿∿.—*Jacobi.* In this country it is known as wave or waved rule.

Wax Process.—The method of making maps or pictures by cutting or pressing through a thin layer of wax spread over a plane surface. After the whole design has been cut or stamped an electrotype is taken, backed up and mounted. This is used to print from.

Wayzgoose.—A stubble goose or young goose suitable for a feast. This is the title of the annual excursion and dinner of the journeymen printers in England, preparations being made long beforehand. The name is not known here. It is sometimes spelled waysgoose and wayzegoose.

Weak Ink.—Poor and thin ink.

Web Machines.—Cylindrical printing machines in which the paper is laid on by tapes. They are known in this country as WEB PRESSES, which see.

Web Press.—A press so made that all of its operations are continuous, the cylinder and impression-cylinder always turning in one way; the press is supplied with paper from a roll, which is unwound as rapidly as required. Nicholson grasped the idea of continuous printing, but did not know that paper would soon be made in such a way that it could be fed to a press from a reel. After the introduction of the Fourdrinier machine paper was made of any length required; but while Hill and Wilkinson each had an idea of improvements which might come, no actual press upon this plan was invented before that of Bullock, whose chief patent for this purpose was taken out on April 14, 1863. It was several years after this date when the machine came into use. About 1865 the proprietors of the London Times began experimenting on the same lines, and, availing themselves of the ideas of Bullock, finally produced the Walter press. At about this time Marinoni utilized the same conception, and in 1869 or 1870 Hoe and other makers began making web presses for their customers. There are now nine or ten manufacturers of these presses in the United States, and they have been able to reach results not dreamed of by Bullock.

The principle of all of these presses is that of continuous motion. One newspaper is no sooner printed than the next one is under impression. As a consequence the cylinder is far smaller than that used in Hoe's lightning press. In no case is the circumference of this cylinder more than sixty inches, which gives a diameter of about nineteen inches. Smaller presses are made for those journals which need no more than forty or forty-five inches in circumference or twelve to fourteen inches in diameter. In printing the impression is generally from the foot to the head, instead of from the outside to the inside. Small cylinders turn more rapidly, have less weight of metal, require less strength in their axle and axle bearings, and obstruct the light less than those which are larger. It would have been impossible to have used such cylinders in early days, as the type could not be so imposed as to be securely held. It was necessary that the art of stereotyping on paper should have been invented before such small curved cylinders could be made. Another improvement was in lengthening the cylinders, so that two newspapers could be printed simultaneously, side by side. Thus the same roll of paper could answer for both, but instead of being from thirty to forty inches in width might be from sixty to eighty. All that would be required would be another set of plates.

A very valuable improvement on these machines is a folding attachment. As the sheet does not slip and can be caught with certainty at a certain place, the folding apparatus can do the work as fast as the press can print the papers. In most cases the sheet passes for its first movement into or through plates of metal which converge. They gradually near each other in such a way that the first fold is completed before the sheet leaves them, the other motions resembling those of other folding-machines. Sheets are also pasted together at the back by a brush or narrow wheel, and are finally cut, so that the purchaser of the paper can read his newspaper just as he reads a book. In the press the initial movement is as in a spool of thread. The unwinding of the spool supplies the filament. The rolls of paper used for this purpose are gigantic in size, weighing several hundred pounds, and the paper unwinds from them with great rapidity. Contrivances are used to facilitate the turning of the roll, as the paper would otherwise tear. Rollers are placed against the surface of the type-cylinder, and as that turns around it is inked. The paper passing between the type-cylinder and the impression-cylinder is printed, and the process is repeated for the second side with other cylinders and is then cut. In some early web presses, however, the paper was cut before it was printed. If not folded as soon as printed, the sheets are piled up in one place for a minute or so and then piled in another, so as to permit the others to be taken away. Much more accuracy of register is attainable on a web press than upon the ordinary press where sheets are fed without points. A late improvement is to have still other impression-cylinders, with red, blue or green ink fountains near them. When an advertisement or a picture is to be printed in colors a part of one of the stereotype plates in the reading-matter is cut out, so as to leave a white space in the paper. The stereotype plate for the color printing upon another cylinder is adjusted so that its impression will strike exactly where this blank is left. This process is repeated for each color required, and the result is a picture, not of much intrinsic merit, but still wonderful when it is considered at how fast a rate the papers are printed. As the larger and more perfect machines are now made, they will print eight, ten, twelve, fourteen or sixteen pages, inserting and pasting one sheet in the other. Their speed varies from twelve to ninety-six thousand an hour, according to the size of the sheet and the intricacy of the machine.

Several other varieties of the web machine have been invented from time to time for special work. One is in use for the Stock Exchange in New York, being employed to send out bulletins of financial news. The web is six inches wide, and on it are printed bulletins nine inches long. The cylinder is grooved with sixteen grooves, each two-thirds of an inch deep and of long primer size. At the bottom the lines of type which are set in these grooves are very close together; at the top the lines are half an inch apart, thus looking as if they were very widely leaded. Each line is secured by a screw at the end. Each page constitutes an entire bulletin. These bulletins can be printed at the rate of sixty thousand copies an hour. Before this machine was used a dozen copyists, each having sixteen sheets of manifold paper, were employed to write the news, which was sent out as soon as possible. The whole machine does not weigh over two hundred pounds. Machinery has been devised for cutting large rolls into several smaller ones, and there is a job-press which employs such paper.

THURLOW WEED.

Weed, Thurlow, an editor and printer of Albany, N. Y., was born at Cairo, Greene County, N. Y., on November 15, 1797. He began the printer's art in the office of Croswell, at Catskill, but was employed as a boy and as a journeyman in many places before he began business for himself. In the war of 1812 he served as a private and as quartermaster-sergeant. In 1816, being then in New York, he was asked by the officers of the Typographical Society, of which he was a member, to see if he could obtain a charter for that body. He was acquainted in Albany and was going thither. This was his first experience with the Legislature. He found, to his surprise, that no charter could be obtained, as many of the members were steadfastly opposed to the incorporation of a society of mechanics. The next year the application was renewed, but the desired result was only reached by the society agreeing to abandon its trades-union features and becoming wholly a benevolent organization. Mr. Weed wrought both at press and case, and in the former department was regarded as one of the best and swiftest workmen in New York. At Jonathan Seymour's he had as companion at press James Harper, the oldest of the Harper brothers. Weed began a newspaper at Rochester shortly before the anti-Masonic excitement, and distinguished himself after Morgan's disappearance by the ability with which he used that fact for partisan purposes. A new party sprang up, of which he was one of the leaders. He was twice elected to the Legislature, and at the close of his second term he was selected by those opposed to the Albany Regency as the proper person to have in that city as a party editor. He consequently removed there in 1830 and established the Albany Evening Journal. He maintained his position as a party manager up to the time of the formation of the Whigs, and afterwards with that and the Republican organization until the day of his death, and from 1835 till 1870 the strongest of all the leaders in the State. He never sought office for himself, but was always ready to help his neighbors and his friends. His kindness to his workmen was most marked. His newspaper was eagerly read, and exerted a wide influence in politics. In November, 1861, he was sent to Europe in a semi-diplomatic capacity. In 1865 he became a resident of New York city, and was for a time editor of the Commercial Advertiser. He died in 1882.

Weekly.—A weekly newspaper. The greatest number of journals in this country and all others are issued weekly. In 1893 there were in the United States 1,885 dailies, 14,017 weeklies and 4,134 other periodicals. In the British Provinces there were 95 dailies, 599 weeklies and 234 other periodicals. There is no community, however small, where there is not enough news to render a journal readable, and the expense of carrying on one is a trifle. A weekly is also adapted for all special purposes, such as religion, trade or art. Many weekly newspapers are a fortune in themselves.

Well.—A receptacle under the cases in the upper part of a composing-frame for holding copy, &c.

DARIUS WELLS.

Wells, Darius, a wood-letter manufacturer, was born on April 26, 1800, at Johnstown, N. Y. He was apprenticed to the printer's trade at Johnstown with William Childs, and afterwards, in connection with Mr. Childs, established the first newspaper at Amsterdam, N. Y. In 1826 they removed to New York, where they continued the printing business in a small way. In 1828 he began the manufacture of wood type, at about the same time as another printer named Lomax. The latter, however, cut upon the side of the wood, while Mr. Wells cut upon the end, in the same manner as practiced by engravers. At first the letter was drawn upon paper, pressed face down upon the wood, and then a bodkin or other hard-pointed instrument was passed around the lines of the letters, indicating the width, length and shape of the strokes. This being done, the paper was taken away and the hollow parts were cut by engravers' chisels and gouges. This was a very slow and tedious method, and led to the invention of a lateral revolving cutter, now known as a routing machine. In the year 1828 Mr. Wells issued a specimen book, which was a small quarto pamphlet of about twenty pages. The specimens were of Roman, antique and Italic faces, ranging from seven-line pica to twenty-eight-line. Eight cents was charged a letter for the former size, and twenty-eight for the latter. Metal type then, as now, was rarely cast larger than twelve-line. He also began preparing engravers' boxwood. A few years later he entered into partnership with E. R. Webb, and as Wells & Webb did for many years a large and profitable business. They were the first to make a specialty of second-hand type and machinery. Mr. Wells continued in the business until 1856, when he withdrew. Lately the business was in the hands of Vanderburgh, Wells & Co., and now is carried on by Heber Wells, a younger son of Darius Wells. After Mr. Wells retired he became postmaster at Paterson, N. J., holding this position for thirteen years. He died on May 27, 1875.

Wells, Horace, a type-founder of Cincinnati, was the son of Oliver Wells, also a type-founder, who had been a clock-maker originally. The senior Wells was one of the workmen trained by Elihu White, and when it was determined to establish a type-foundry in Cincinnati as a branch of the New York business he was placed in charge. Several months were occupied in fitting up and in the journey thither, and the first type was cast on July 4, 1820. Horace Wells was born at Hartford, Conn., in 1797, learned the trade of a cabinet-maker and accompanied his father to the West. There he found ample room for a good workman, and when Mr. Foote, the original business agent, retired the father and son succeeded him. Oliver Wells sold his interest in 1833, and soon after Horace Wells retired to a farm; but the financial difficulties in 1837 embarrassed the establishment, resulting in the return of the latter to business in 1842. A very large increase of trade was at once perceptible, and he succeeded in buying nearly all of the stock. In 1851 he visited his farm at Oxford, in Butler County, Ohio. Several young men were in front of the principal hotel there, handling firearms. A rifle was accidentally discharged as he passed by, the bullet striking him and resulting in his immediate death. The foundry is still carried on, being known as the Cincinnati Type-Foundry. It is the ingenious machine devised there by Mr. Barth, one of the proprietors, which is generally used in the various foundries of the country for producing complete type, the letters not requiring to be handled in breaking, rubbing or grooving.

Welsh.—The language of Wales, being one of the Celtic tongues, and the only one in which there is much printing. The only information, says Cotton, which we possess respecting the early typography of this principality is gathered from one of the Martin Mar-prelate tracts of Queen Elizabeth's reign, about 1588, in which mention is made of "knave Thackwell the printer, which printed popyshe and trayterous Welshe bookes in Wales." Nothing more has ever been discovered of this printer or any of his books. In the Gentleman's Magazine for August, 1821, it is observed by a correspondent that, "from the invention of printing downwards, so adverse were the circumstances attending the diffusion of Welsh literature that there was not a printing-press in the principality until the year 1734 or thereabouts, when a temporary one was set up by Mr. Lewis Morris, of Bod-Edeyrn, in Anglesey." In 1551 some portions of the Bible were translated from the Vulgate into the Welsh language. In 1567 the New Testament was printed by Henry Denham, the preface being in English. The first complete Welsh Bible is known as Morgan's Bible, and is dated 1588. Several other editions and translations were published before 1800, but it was practically impossible for poor persons to own a copy of the Scriptures, which, as the Welsh are a very religious people, was a great deprivation. It was this scarcity which occasioned the founding of the British and Foreign Bible Society, which has since expended nearly fifty millions of dollars in printing and circulating the Scriptures. Attention having been called to the deficiency in Wales, a meeting was held in London in March, 1804, at which it was proposed to print the Bible in various languages in large quantities and sell it at about cost to benevolent individuals and sub-societies who would undertake its distribution. Since that time there has been no lack of Bibles in Wales. The country has now a population of about thirteen hundred thousand and is divided into twelve counties. No town stands in importance much above the others. The population of the Welsh-speaking people in Wales has not decreased within the last century, but is now larger than ever, in spite of the growth of English in the counties bordering upon England. There are seventeen newspapers published in the vernacular, with a combined circulation of over 120,000; one Welsh magazine has a circulation of 37,760; one firm of publishers has laid out £18,000 in the production of a single Welsh work; and a Welsh-English dictionary required four hundred pages to reach the end of the first letter of the alphabet, subscribers paying half a guinea for installments of this size. Printing has been carried on in the Welsh language in the United States for many years. A newspaper called Cymro-America was printed in New York in 1832. There are two principal Welsh colonies in this country. One is in the neighborhood of Utica, N. Y., where much printing has been done in Welsh. A second centre is near Scranton, Pa. Five or six newspapers are published in Welsh in America. The Welsh alphabet has twenty-eight letters, ch, dd, ff, ng, ll, ph, sh and th each being counted as one. J, q, x and z are not properly Welsh letters, nor are they wanted in words purely Welsh. Two letters are peculiarly accented—ŵ and ŷ. In addition, there are the ordinary accents. K and v occur frequently in old Welsh, but are now generally disused; the place of the former is supplied by c, which always has the hard sound, and that of the latter by f. The variations in Welsh, corresponding to inflection and conjugation, are made at the beginning of the word instead of at the end, as in Latin, Greek, German and English. This rule is followed by all of the other Celtic languages—Erse, Gaelic, Breton, Manx and Cornish.

Wendell, Cornelius, Congressional printer, was born at Cambridge, N. Y., in 1813. He was apprenticed to Croswell & Van Benthuysen, State printers, at Albany, about 1828, and after completing his time acted as foreman for Mr. Van Benthuysen. In 1845 he removed to Washington as Congressional printer, and continued in this position for many years. The business was far smaller than at present, and the appointment of employees was not wholly determined by their politics. After a number of years' experience he determined to build a new office which should be more convenient than the old, and in this edifice he put many improvements. It was finished in 1857 and is still standing, having been enlarged to meet the increased demands of the business. He was himself a good workman, and the establishment was laid out in accordance with the best methods. He was distinguished for the facility and accuracy with which he could tell, from a rapid glance over a manuscript, about how many pages it would make when printed and the shortest time within which the work could be done, if haste were desirable. He sold his office in 1861 to the Government; but in 1866 was appointed Superintendent of Public Printing and

CORNELIUS WENDELL.

resumed his position at the head of affairs. A few months later, however, he was legislated out of office on a charge of political favoritism to the exclusion of loyal soldiers. He died at Northampton, Mass., while on a visit there on October 7, 1870.

Werk (Ger.).—A work.

West Virginia.—One of the United States, lying entirely in the Appalachian range, about midway of its length, and divided from Virginia during the war. It was not settled until after the Revolution. Printing began at least as early as 1821, the Charlestown Free Press having been established in that year; but there is little other information. In 1880 there were published 2 daily and 107 other periodicals. In 1893 the number had increased to 13 daily and 143 other periodicals. Wheeling does more printing than any of the other cities, which are all small.

Westcott Type-Casting Machine.—An invention shown at the Centennial Exposition in Philadelphia in the year 1876. The operator played upon a keyboard, the movement carrying the corresponding mátrix to a position where it received a tiny jet of molten metal. Hooks drew this portion of metal, which had instantly been transformed into a type, out of its matrix, and it was then thrust forward between cutters, which deprived it of any superfluous metal. The perfected type was then placed in a stick. Justification was done as ordinarily. There was no distribution, as the type was thrown back into the melting-pot as soon as used. The inventor was Charles H. Westcott, an employing printer of New York.

Wetter Numbering-Machine.—A device for use on printing-presses, made by Joseph Wetter & Co., Brooklyn, N. Y. It does consecutive numbering, and admits of printing and numbering at one impression, and is entirely automatic. The machine is locked in the same form with the type, and one or more machines may be thus employed. A special frame is also employed, designed for using one or more of such machines at one time and operated by two plungers, one on each end of the frame. Any number of machines can be used in this frame and can be adjusted to any desired length. One of the most important features possessed by this machine is in having nothing to precede the figures and the plunger operating from one up to a dozen or more machines at one time, and, being on each end of the working-frame, touches outside of the paper, leaving only the numbers on the paper or card. Any character or design may precede or follow the figures if desired. This machine is adequate for almost every kind of numbering, and has the advantage of printing and numbering at one impression. It is very useful for numbering cards or coupon tickets.

WETTER NUMBERING MACHINE.

Wetting-Boards.—The boards placed between the different reams in the press in the wetting department. —*Jacobi.*

Wetting Department.—That part of a printing-office where the paper is wetted down. Except with news paper, very little of this is now done in America.

Wetting-Down.—The process of damping paper for printing purposes.

Wetting-Machines.—Mechanical contrivances for wetting down paper, thus superseding hand-wetting.

Wetting Paper.—Except for newspapers, "wetting down" paper has been nearly entirely abandoned in the United States; but in Great Britain 95 per cent. of the paper used in printing is yet wet down or dampened, and most of the print-paper in other countries is handled in the same manner. The arguments in favor of wetting paper are that it will take the color more easily and uniformly; the gloss is taken off, rendering the letters more legible, particularly by artificial light; the ink sinks in more deeply, becoming more intimately a part of the paper, and old and worn type which cannot otherwise be printed from can be made clear and distinct by this procedure. It requires also less care and trouble to obtain a decently printed sheet, and demands less ink. Against it are the facts that the gloss is all taken off the surface, making the paper look as if much inferior to what it really is; wood-cuts cannot be well printed upon it, as the paper sinks into the hollows, instead of remaining upon the summit of lines; new type looks with it like old, as all lines are thickened; and time must be taken to wet down the sheets, and after they are printed to dry them. The latter procedure requires much room and much extra handling. There is also a liability that paper which has been wet for a long time may mildew. With dry paper an order of ordinary size can be delivered the next day, unless more care is to be taken than is usual; with wet paper the least time required would be twelve hours for the heap to stand after being wet, and a day at least to dry afterwards. Putting the sheets in a standing-press to take out the indentation is more necessary than with dry paper, and after all it will not look so well. Wherever a word or letter comes in wet paper the texture of the paper yields somewhat and becomes baggy. This cannot be cold pressed or hot pressed out.

Dry printing has been practiced in the United States since 1849, if not earlier. In that year William C. Martin, lately president of the New York Typothetæ, began printing with dry paper on a hand-press, and secured satisfactory results. His neighbors, however, were not able to imitate him. John W. Oliver and Francis Hart at about the same time, or a little after, began its trial on power-presses, and from one office it spread to another. In 1860 only the more skillful pressmen attempted to print on dry paper; but by 1870 this method was generally known and practiced. For ten years past little has been done in any other way; yet, as this book will be used as a statement of the art of to-day in all of its permutations, it would be wrong not to give a full account of this lost method in New York, but surviving everywhere except in North America.

There are three ways of wetting. Dipping is the most common, and sprinkling the next. Mechanical wetting of the sheets of great newspapers is done differently from either of the other two plans, although it is a species of sprinkling. It is obvious that if half or quarter of a ream of paper was to be wet at once, by dipping or by sprinkling, the outside sheets would alone be wet, and that those inside would be too dry. If wet by two or three sheets at a time there would be too much water. They would not be dry enough in a week to print on. The plan adopted is usually to have a trough full of clean water, alongside of which is placed the heap of dry paper. On a letter-board near by the pressman first places some common paper, and then a quire from the heap which he has opened. He then takes half a quire or a quire from the heap, dips it into the water so that it shall be entirely submerged, and then draws it out either quickly or slowly, according to the quality and thickness of the paper. He then lays it down, the crease of the second quire coming exactly against the crease of the first quire, but reversed, so that the backs of the quires shall be against each other. If the opposite plan were followed the whole heap would retain its crease. This plan is followed until the first token is reached; he then doubles down a corner of the upper sheet, and generally the unfolded corner diagonally opposite the fold hangs out a little. This device is so that the pressman may know how much work he has done when this is worked off. A similar thing is done to each token. When the whole heap is wet a piece of rough paper is put over it that it may not be soiled by the letter-board, and also a little water is thrown on this. Upon the heap is placed a letter-board, and on this a heavy stone or an iron weight. It should be noted that some paper is very spongy and absorbs much water; other paper takes very little. In the latter case it may be well to divide the quire into small sections and pass these slowly through the water two or three times; in the former there are cases when two quires may be dipped at once, and that quickly. Cards and glazed paper are no longer wet, even in Great Britain. It is forty years since the practice was entirely abandoned in New York. Paper is generally wet at the close of one day's work, so that it can be used the next day. Six hours is about the shortest time in which it can be employed in any case, as the paper would not become evenly moist in less time, and paper which has been wet four or five days, particularly in summer, is likely to mildew. In case the printing of a form is to be postponed in summer for a week or ten days after the paper has been wet it is better to let it dry out, opening it out into small lots and wetting it again. Sprinkling is done with a whisk-broom, and is a neat and good method, but it is not applicable to large quantities. The heap must be wet at its edges from time to time to prevent it from getting dry.

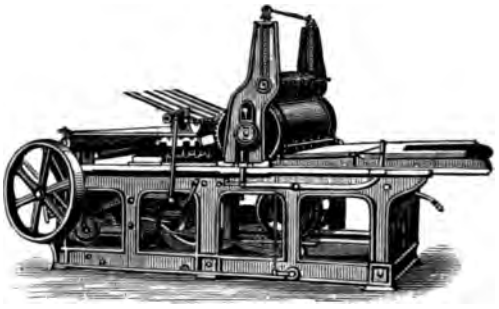
A method of wetting paper was devised by John Oldham, director of the printing department of the Bank of Ireland, some seventy years ago, which may afford some hints to those who are now compelled to wet flat news. His apparatus consisted of a large cast-iron box, the lid of which was made to shut with an air-tight joint. A reservoir of water beneath the box had communication with it by a perpendicular pipe which could be intercepted at pleasure by means of a stop-cock. The paper to be wetted was evenly piled in railwork wooden boxes, placed so that the paper stood upon its edge in the cast-iron vessel, from which the air was drawn by means of an air-pump; the stop-cock then being opened the atmospheric pressure upon the surface of the reservoir of water caused a portion of it to rise through the pipe into the box exhausted of air, and instantly to infuse itself minutely and equally into the paper. The air was next admitted by opening a valve, and the pressure forced the water into the paper, which was then taken out of the vessel, lying as even in the railwork one sheet upon another as it was first placed when dry. The superfluous moisture was next expressed by means either of a vertical screw and lever or revolving cylinders properly adjusted (with great weights and levers to maintain the pressure) so as to admit any quantity of paper, little or much, between them. Thus in a few minutes by this process as much paper could be wetted and made ready for working as the iron vessel would contain.

The paper for web presses is wet by means of fine jets of water, spraying the roll as it is unwound. Many newspapers printed on web presses have entirely abandoned wetting.

Perhaps the objections to dry paper have never been stated more systematically than by the Graphic Club in Stuttgart, Germany, where wet work is common: "Glazed or calendered paper may be printed dry, but not always with satisfactory results, much depending upon the quality of the paper. The making ready for dry paper must inevitably require more time than for wet; dry paper will wear out type more rapidly, and without new or nearly new type fine printing cannot be done on dry paper. Illustrations will always look cleaner on paper which has been wet, and artistic type faces will show to greater advantage. Inequalities in inking will show immediately on dry paper, and if not equal in body the thinner sheets will look as if the make-ready had been faulty. Dry paper, leaving heavier deposits of ink on the form, necessitates more frequent washings. On the other hand, it is easier to keep a good register with dry paper, as the sheets do not shrink, and the grippers hold them tighter and more evenly. Paper not perfectly homogeneous will have all its imperfections brought to view if printed dry. Sumptuous printing on heavy paper, such as is used for copperplate work, will not give satisfactory impressions on dry paper. Paper wet down and calendered before printing requires less ink than calendered paper; paper wet down and not calendered takes more ink than dry and calendered." The pressmen's section of this club concluded by stating that "if bookwork is to be printed dry the paper must be smooth and heavy, the type new, the ink of good quality, and then the wear and tear of type and press will be greater. Open wood-cuts, requiring but little ink, may be printed on dry paper when it is well calendered and of smooth and soft quality; but full cuts, to which a large supply of ink must be given, will never show to best advantage on dry paper."

Wetting-Trough.—The receptacle for water used in wetting down paper.

Wharfedale Machine.—A cylindrical machine manufactured in Yorkshire, England, and called after the place of that name.


WHARFEDALE MACHINE.

Whatman Paper.—A first-class quality of English hand-made paper. It can be obtained either laid or wove, and is mostly used for drawing purposes.

Whip.—A slang term for a more than ordinarily quick compositor.—*Jacobi.*

Whip-Stitching.—When the leaves of a book are single, that is, have no fold at the back, they are sewed together in sections, the stitches on the back of each section being very close together, and extending from top to bottom. This is called whip-stitching. These sections are finally sewed in the same manner as the sections of a book with folded leaves.

White.—Any blank space between lines. The space at the end of lines or the blank portion of a short page is thus termed. This expression is much used in England, but very little in America, leading, slugging, quadding or blanking being used instead. A white is a blank line of the body-type of a book.

White Edges.—Edges of books simply cut—not colored or gilded.

White, Elihu, a celebrated type-founder of New York, was born in Bolton, Conn., on July 27, 1778. In 1805, in concert with another inventor named Wing, he began casting types at Hartford, but as they had no one to instruct them in many of the most common operations of a type-foundry their progress for a long time was slow. Their plan was to cast a number of types together, and then separate them. In 1810 Mr. White believed that New York would be a better place for him than Hartford, and he removed thither, being in that part of the city known as Greenwich village. Several years after he removed to No. 11 Thames street, where he was joined by his brother, Julius White, under the firm-name of E. & J. White. In 1810 there were only two foundries in the country, one being in Philadelphia and one in Baltimore, none having started in Boston, and the two prior attempts in New York having been abandoned. The early faces shown by Mr. White were good, and he soon commanded a large trade. The first specimen-book of this foundry which is preserved is that of 1819. It showed fifty-eight sizes and styles in all, the display type being seven sizes of ornamented, a double-pica script, and a back-slope. There was a series of Romans, but no agate, that type not having then been made. Pearl size was $2.37 a pound; nonpareil, $1.40; brevier, 76 cents; long primer, 56 cents; and pica, 44 cents. In 1815 Mr. White began stereotyping, making the first New Testament prepared for the Bible Society, and soon after embarked in publishing, as Bliss & White. He began a branch type-foundry at Cincinnati in 1820, the first west of tide-water, and another later in Buffalo. He became interested in type-casting with machinery, and spent over sixty thousand dollars on one machine for that purpose. Julius White died about 1831, and Elihu White followed him in 1836. The business was continued afterwards by John T. White, his son. For many years it was carried on by Farmer, Little & Co., the firm consisting of Aaron D. Farmer, Andrew Little, John Bentley and William W. Farmer. Mr. Little and Mr. Bentley withdrew some two years ago, and the two Farmers, father and son, now conduct the foundry established in 1805. They have lately introduced machines to cast and complete type at one operation, which work very successfully.

White Ink.—An ink used for making tints, of which it forms the body, small quantities of inks of various colors being added to and mixed with it. The contrary process should never be followed, or that in which a quantity of red, yellow or blue is taken as the basis, with which white is mixed. It will almost invariably result in having a large quantity of ink to throw away. White ink is more satisfactory as a basis for color-work than varnish, although it varies the result more.

White Line.—A line of quadrats or its equivalent.

White Metal.—Casts in type metal distinct from electrotype faces, which are coppered, and therefore have a reddish hue. Non-coppered type is known as whitefaced or barefaced when necessary to mark the distinction between the two.

White Out.—To space or branch out any composed matter, such as displayed or advertisement work. Unused in America.—*Jacobi.*

White Page.—A page on which there is no matter.

White Paper.—Although the first form be printed off, yet workmen call that sheet white paper till the reiteration be printed.—*Stower.* In this usage white paper is equivalent to first side, whether the work has begun or is finished. White paper is also used in contrast to tinted paper or blue paper.

White Paper Register.—To make register without ink by means of impression only.

White Paper Warehouseman.—In large offices the person responsible for the white paper or unprinted work. Little used in America.

White Side.—The first side of a sheet, although both sides are white. A workman will say: "We have done the white side of a sheet."

Whitefriars Machine.—A newspaper machine of rotary make invented by Joseph Pardoe, in England.

Whiting Out.—Blanking out.—*Jacobi.*

Whole Bound.—Applied to books entirely bound in leather.

Whole Fractions.—Fractions cast on one body, as ¼, ½, ¾, distinct from split fractions on half bodies.

Whole Frames.—A frame or stand at which two compositors can work. This is the English name; in America this is called a double stand.

Whole Press.—A term formerly employed when two men were working at a hand-press. One man pulled and another rolled or used the balls. If one man did both, which was sometimes necessary on an emergency, he was said to be working at half press.

Wide Measures.—Long and wide lines of type, in contradistinction to those which are narrow or short. On newspapers a wide measure is beyond fourteen ems of pica or twenty-eight of nonpareil; on books a wide measure is more than twenty-five ems of pica.

Wide Spacing.—Composed matter which has more than the average space between the words. In leaded matter nearly everything should be driven out, no thin spacing being practiced. Two thick spaces is the largest allowable space on good bookwork. On double-leaded matter, when the ordinary space is an en quadrat, thin spacing is not admissible at all, and an em quadrat is the largest permissible space. Sometimes on very fine books with wide measures, containing beyond thirty ems of the body type, the spacing is two thick spaces. If it extends beyond forty ems divisions are not permitted then under less than four letters. After a proof on any matter has been read it is the proof-reader's duty to cast his eye up and down the galley to see if there are any places where the spacing for several lines is too wide, comparing it with the remainder of the matter. If any such spacing occurs it should be marked, and the matter overrun.

Wiederdruck (Ger.).—The reiteration, the second side of a sheet.

Williams, Samuel Wells, son of William Williams, a publisher of Utica, N. Y., was born in that city on September 22, 1812, and died in New Haven, Conn., on February 16, 1884. He was appointed, while attending the Rensselaer Institute at Troy, missionary printer to the American Board of Foreign Missions. He had already some knowledge of printing, and spent the winter of 1832 in Utica, after his graduation, in improving his knowledge of the art. He reached Canton, China, in October, 1833. A press and a font of English type had been sent out by a New York church, and this was used by Mr. Williams to print the Chinese Repository, a monthly periodical which he and his fellow-missionary, E. C. Bridgman, edited and published for twenty years. He remained in charge of this mission press until its destruction by a native mob in 1856. Its operations had to be conducted with difficulties, often against express orders for its discontinuance from the Government, which prohibited the use of tracts and Bibles printed in Chinese. In 1842 he added to its stock the Chinese metallic types owned by the East India Company. In 1845 he obtained a font of movable Chinese type from steel punches cut by Beyerhaus of Berlin. A careful examination of the characters in that language showed that by cutting punches for the few hundreds not commonly used, and for those which could not be divided perpendicularly, the remainder could be formed in such a way that about three thousand matrices would suffice to form over twenty thousand serviceable types. The punches required were begun in 1847, al-

S. WELLS WILLIAMS.

though not completed until 1857. Besides the Repository Mr. Williams in twenty-three years printed some fifteen books in English, nine of which he wrote wholly or in part. Thirty-eight thousand volumes were issued from this pioneer foreign press in the far East, besides many pamphlets. Mr. Williams wrote seven different works on Chinese subjects and the Chinese language in Chinese and English, all of which he printed himself. On a visit to America in 1846–48 he wrote the Middle Kingdom, a work giving an account of China, which remains a high authority to this day. He also prepared a map of China. In 1853 he attended Commodore Perry as an interpreter on that expedition which opened Japan to civilization. He had previously acquired the Japanese language. In 1855 he was made first secretary and interpreter of the United States Legation in China, holding this post for twenty years. His great work, the Syllabic Dictionary of the Chinese Language, occupied him ten years in its composition, and was printed in Shanghai under his personal supervision in 1872. In 1876, after forty-three years' residence in China, he returned to America, spending the remainder of his days in New Haven, where he occupied the chair of Chinese language and literature in Yale University. His biography has been written by his son, F. W. Williams, and was published in 1889. It is very interesting.

Williams, William, a publisher and bookseller in Utica, N. Y., was born on October 12, 1787, and died on June 10, 1850. In 1800 he was apprenticed to the printing trade in the office of his relative, William McLean, and later was employed in the same business by a brother-in-law, Asahel Seward, with whom in 1808 he formed a partnership as Seward & Williams. The firm became the most important publishing house west of Albany, being continued under Mr. Williams's name after Seward's retirement in 1824 until 1836. The books from this press were largely of a religious or educational character, including Webster's Speller, Watts's Divine Songs, Hastings's Musica Sacra, and nine or ten stereotype editions of the New Testament. Between 1816 and 1824 they published a newspaper known as the Utica Patriot and by other names, and in 1830 Mr. Williams founded the Elucidator, an anti-Masonic sheet, which failed in the following year. He also printed the well-known Light on Masonry. Among the apprentices in his office were Thurlow Weed, Henry Ivison, Alfred North, a pioneer missionary to the Indians; R. B. Shepard and Ellis H. Roberts, late sub-treasurer in New York.

Wilson, John, of Cambridge, Mass., died at his residence in that city in August, 1868. He was a native of Edinburgh, Scotland, and served his apprenticeship in that city. Afterwards he directed a large establishment at Belfast, Ireland, and was concerned in one at Manchester. He came to the United States about 1843, and in Boston and Cambridge did some of the finest work ever turned out in this country. Mr. Wilson was the author of a standard book on punctuation and of several works upon Unitarianism. Harvard College conferred upon him the degree of Master of Arts, an unprecedented honor for a printer, except in the case of Franklin.

Winder Economic Composer.—A typesetting-machine made in England which has not been introduced into the United States. It is inexpensive and simple, and claims to be economical.

Winkelhaken (Ger.).—Composing-stick.

Winter.—In the old wooden hand-press, a stout, solid block of wood upon which the bed of the press rested at the moment of impression, and which gave to the bed its necessary support against the power of the screw. It was nine inches thick.

Wipe.—This is when the rollers catch or deposit an excess of ink on the edge of a form in printing.

Wipings.—Cotton refuse used for wiping up and cleansing machinery.—*Jacobi.* They are known in this country as cotton waste or rags.

Wire-Mark.—A mark in paper which is seen when the sheet is held up to the light.

Wire-Sewn.—Books which are sewn with wire instead of thread.

Wire-Stabbed.—Pamphlets and other cheap books stabbed with wire instead of thread.

Wire-Stitching.—A fastening for the signatures of books. A machine has been contrived which forms, drives and clinches a staple from a continuous roll of wire, this being used instead of thread in stitching together books.

Wisconsin.—One of the United States lying upon the great lakes, and originally part of the Northwest Territory. Printing was introduced at Green Bay by Suydam & Ellis, who published the Green Bay Intelligencer in 1835. Another paper called the Spectator was begun there in 1836 by Joseph Dickinson. Other towns in which printing was begun at an early date were Milwaukee, 1836; Belmont, 1836; Racine, 1838; Mineral Point, 1838; Platteville, 1839; Kenosha, 1840; Fond du Lac, 1843; Lancaster, 1843; Prairie du Chien, 1843; Watertown, 1847; Portage City, 1850; Madison, 1838; Beaver Dam, 1848; Janesville, 1845. Many German papers are now issued in that State. The earliest of these began in 1844 at Milwaukee, and the earliest Scandinavian periodical at Inmanville in 1851. The total number of periodicals issued in 1840 was 6; in 1850, 46; 1860, 155; 1870, 190; 1880, 340. Of the last there were 21 daily and 319 other periodicals. In 1894 there were 51 daily and 524 other periodicals. The chief city is Milwaukee, and there more printing is done than in any other town. Next to it in importance are La Crosse, Madison, Oshkosh, Racine, Sheboygan and West Superior. The capital of the State is Madison, and there is in that city, under the charge of the Wisconsin Historical Society, a better collection of American newspaper files than in any other small city in the country, and only equaled by three or four in any of the seaboard cities. Systematic collection has been carried on for years.

Witness.—When a volume has been trimmed, leaving some of the edges still rough, the latter are a witness as to the original size of the sheet, and prove that it has not been cut down.

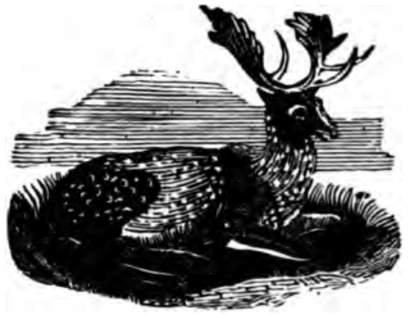
Wood Border.—An outside border of wooden rule used for poster and broadside work.

Wood-Cut Paper.—A half-plate or rather soft printing paper specially adapted to printing wood-cuts and other illustrations.

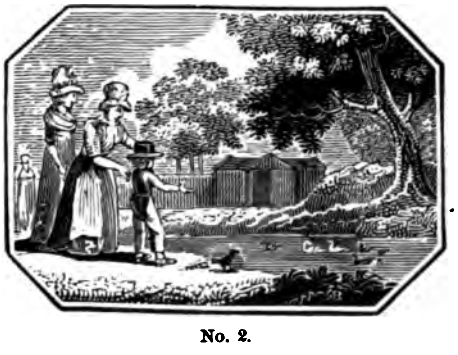
Wood-Cut Printing.—The method of printing wood-cuts is shown under the article Overlay. The form is leveled so that the surface is everywhere exactly even. Over each of the cuts is an overlay, thicker or thinner, as may be required, to bring out the proper appearance. The greatest pressure, and consequently the thickest overlay, is applied where the solids are heaviest, and the lightest parts of the form have the thinnest, sometimes even requiring a part of the packing to be cut away or lowered. Wood-cuts rarely go on a press, except for proving. Cuts are electrotyped as soon as made, and the electrotypes are used instead of the originals, thus providing against accident.

Wood-Cuts.—Engravings on wood—generally boxwood. See Wood-Engraving.

Wood-Engraving.—This art is very useful to the printer, and very closely allied to his own. The block-books which preceded letter-press printing formed the connecting link between it and engraving, and ever since that time whatever has improved the one has improved the other. The first artists in this way drew heavy lines, and even up to the beginning of the present century they numbered in many cases only fifteen or twenty to the inch. It was useless to cut very much finer, because the presses, with heavy blankets and wet paper, could not print them. Wood is a soft substance. To obtain impressions from a fine line it should be well protected on all sides, or otherwise it will be crushed. The ideal line in wood-engraving would be like the edge of a pen-knife; but if thus made it would be broken or smashed very soon; the ink would not lie exclusively upon the surface of the edge, but would be on its sides, and the pressure when printing would tend to make it still wider. Where it touched the paper that would yield and come down upon each side. It was therefore necessary that the printing-press and its inking apparatus should be improved before the printing of wood-cuts could attain any high degree of excellence. That this was the reason we see by the example of Anderson. His style was fully formed before an iron hand-press was known in America; when this became common he had been thirty-five years an engraver. He did not alter his style, but he did much more work upon a given sized block than he had formerly been in the habit of doing. The iron hand-press also made it possible to print blocks much larger than before had been attempted. It was easier then to print a block nine by twelve inches than it had been before to print one three by four. Of late years mechanical improvements have become so great, and the minuteness with which lines can be made by process work is so much increased, that wood-engravers have gone to the opposite extreme from Bewick and Anderson, and have cut lines so fine that to be distinguished one from another a microscope must be used.



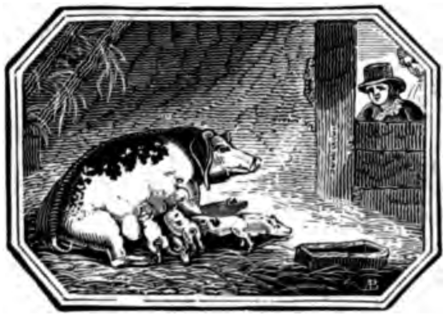
No. 1.



No. 2.

The pieces of wood used are called blocks. Mahogany, maple and pear-wood are sometimes used, and pine is a good medium for theatre cuts; but the best engravings are always upon boxwood, the work being upon the end of the grain. They are of exactly the height of type, and are made very smooth upon the surface. Large blocks are provided by uniting two or more smaller blocks, as they are always small. The surface of the block being too smooth to receive the markings of a pencil, it is roughened and at the same time delicately whitened all over with moistened powder of fine brick and flake white. When dry the drawing is put upon it, care being taken that nothing is marked which is not to appear in print. The drawing is reversed from what it will appear in print, and to do this easily and well requires considerable practice. A reflection of the original in a looking-glass is a good method of testing the accuracy of the work. Reductions from other engravings are effected by stretching across the original threads at regular intervals. Similar intervals are marked on the block, bearing relatively the same proportion to the whole engraving, but larger or smaller, as the case may be. The drawing is made on the block so as to accommodate the sketch to the new size.

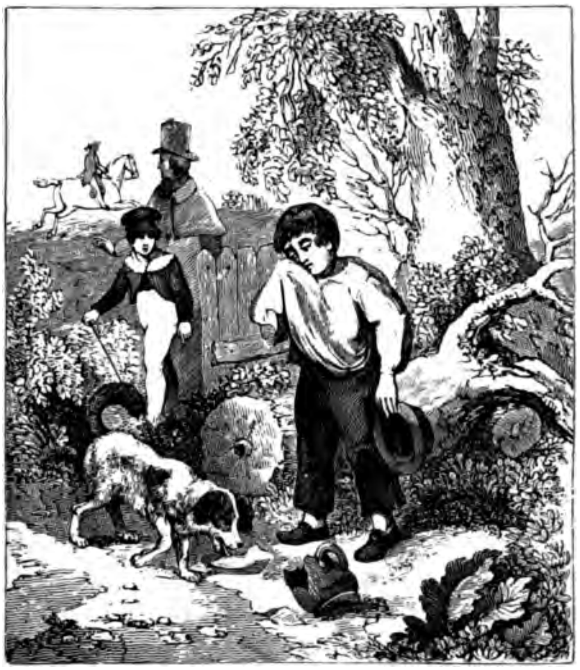
The block when work begins is laid upon a pad and is held in the engraver's left hand while it is cut by the graver in his right hand. The work is best executed with a strong northern light. The first lesson for a learner is in cutting straight lines. He then takes up curved and waving lines, and finally crosshatching, or making the lines so that they cross each other. Great patience and care must be exercised by a learner in his exercises, for a line must be cut perfectly straight, and it must not be lighter or heavier in any part of its whole course than it is in another part. It must likewise match in thickness and weight other lines at its side. The cutting must not be in such a way that the wall shall be perpendicular; but it must be wider at the bottom than the top, so as to support the part which has pressure. Engravers also leave dots, as in stippling, and short lines having no particular connection with other lines. These are most easily executed of all wood-engravings.



No. 3.

The tools used are gravers, tint tools, scoopers or gouges, chisels or flat tools, and a tool for scraping away the wood in the process of lowering. The gravers are of different forms, but are usually triangular at the end, one of the points projecting. Tint tools are deeper in the sides than gravers, and are used where a succession of fine parallel lines are wanted. The large hollow spaces are cut out with all kinds of tools. Ruling-machines are also used. In some cases the draughtsman or artist only indicates roughly the lines, the drawing being made with a wash. In such work the engraver translates each particular portion into the lines or marks which he deems appropriate. When engravings are made directly from photographs, or when photographs are made upon the wood, as is now very common, the same practice must be followed. The sky, if tranquil, is usually denoted by long, fine lines; waves of the sea by short, curved and broken lines, and some other appearances have a conventional treatment; but usually all depends upon the taste, skill and judgment of the engraver. Where there are no lines he must devise some which will answer the purpose. Line-engraving in wood signifies that everything is indicated by long, unbroken lines, although varying in form, weight and direction. It is regarded as being of the highest class.

In this article are given specimens of wood-engravings. Process engravings in line resemble them. The latter are drawn with pen and ink. They are usually more scratchy, harder in outlines, less agreeable in the solids and less tender in the light places. One of the woodcuts, which was executed about 1815, shows the original method of drawing and engraving in America. The lines are heavy and far apart, and the whole execution is very poor. The others were made about 1830. They are much finer, but very stiff, and not demanding as much work as is now put upon wood-engravings of good quality. No. 4 is by Anderson, and was executed about 1845. It is in what was known as the modern style before wood-engraving was executed as it is at present. Much more was left totally without lines. Nos. 2 and 3 are in the style of Bewick by an American follower. The lines in the first are about sixty to the inch, and there is very little shading.



No. 4.

Wood Furniture.—Furniture made of wood—distinct from metal furniture.

Wood-Letter Racks.—Trays placed in racks for holding fonts of wood-letter.

Wood-Letter Shelves.—Receptacles for fonts of wood-letter.

Wood-Pulp.—See PAPER-MAKING.

Wood Rules.—Wooden rules used for the larger class of work, such as posters and broadsides. They do not differ, except in size, much from brass rules.

Wood Type.—Type made of wood and larger than those used in books and newspapers. Wood was long known as a material for engravers and block printers before it was used as a material for movable types, except so far as it may have been employed by those who made early block-books and the rude pamphlets which immediately followed them. The difficulty in their manufacture was that the process was so slow that even the most expert man could make only a few in a day; the woods which could be carved most easily were the softest and broke more readily than others; and there was a difficulty about the perfect quadrature of the shank. These considerations have led all practical printers, writing on the invention of typography, to disbelieve the once common theory that there was a transition period between block-books and the introduction of metal types. Single letters and even words have long been made, and are to this day in remote localities where printing-offices are far from type-foundries. Wood type as now made owes its importance to Darius Wells, a printer of New York, who in the intervals of business cut out wooden types and thought of plans for making them by machinery. He was able in 1828 to begin selling his product. At about the same time another printer, John Lomax, turned his attention to the same problem, and a little later William Leavenworth began making such characters at Allentown, N. J. Since that time the manufacture has been carried on by several houses besides that founded by Mr. Wells, the most prominent having been W. H. Page & Co., J. G. Cooley & Co., and the Hamilton Manufacturing Company. All employ substantially the same methods of manufacture.

The wood employed must be well seasoned, a year or two not being too much. The log is cut across the grain in thin slices which are a little above type high. The slice is twice planed, then shellacked and sandpapered. The surface becomes of a glossy smoothness. It is then turned over and very carefully planed, only the slightest shaving being taken off, leaving the slice exactly type high. The wood is divided into strips, each being the width of the size of letter intended to be cut from it, as eight-line, twelve-line, or twenty-four-line. The strips, which are two, three or four inches long, are then passed to the cutter, who finally makes the type. He sits before a large pantographic machine made of steel and operated by steam. At one end of the pantograph the pattern is placed, consisting of a large letter made for that purpose. Here part of the pantograph, a steel finger, passes around the prominences in this pattern, and its other end marks the design upon the wood. A revolving cutter or router cuts away the wood in exact conformity to the design, the block being moved backward, forward and to the side, as may be required. This router is very small, but revolves at the rate of twelve thousand turns in a minute. When the cutting is finished, and a dividing line is made separating the letter face from the face of the remainder of the block, the character is turned over to a finisher, who with wood-engravers' tools cuts those little angular places into which revolving cutters cannot pass, and trims up the letter more or less. The characters are cut from the block by a revolving saw, each one being clamped properly. The letters are then oiled on the surface and are ready for sale soon after.

The material for such type is in this country chiefly rock maple. Mahogany was formerly used somewhat, and so was boxwood. Large lines on posters and the cuts which accompany them are chiefly on pine, but these are generally executed by engravers. Letters have also been made by the band-saw or by a jig-saw, a number at a time, on strips of wood and then veneered on the top of type bodies. They have also been pressed out, a female metal design being fixed in a press and forced against the wood. The parts which should be low in the letter are driven in, while the parts which should be in relief are left untouched. This method was not applicable to some letters, and there was much splitting and uneven warping. It required, also, a die for each letter and each size, while on the common plan one letter answered for a pattern for every size, from two-line up to fifty-line. Large type should be laid on their edges after being used. No wood type should be touched with lye or water, as it causes swelling.

Mr. Duval of Paris has been experimenting with the galvanic process and wooden type, and has, it is said, succeeded in covering the upper part with a coating of copper. This is substantially the Adams process of electrotyping used in Harper's Family Bible in the years 1840 to 1842, but the wood-cuts were ruined by it. The letters are dipped in a galvanoplastic bath, and after a time are coated.

Wooden Composing-Stick.—A long composing-stick for poster work, made of wood for the sake of lightness. Mahogany is preferred.

Wooden Press.—A printing-press made of wood; the first form of the printing-press. See HAND-PRESS.

Woodward, William Henry, lately president of the United Typothetæ and an employing printer at St. Louis, Mo., was born at Coventry, England, on December 11, 1834. His father, the Rev. William Hawkins Woodward, was an eloquent and able divine. He came to this country in 1845, and was the rector of a Protestant Episcopal church in Philadelphia, and was a professor of natural science in several institutions. His first residence here was in Burlington, N. J. William Henry Woodward, the future printer, began the study of his art at Madison, Wis., in the office of Atwood & Buck, in 1850. In 1852 he went to St. Louis, where he worked for a while under instructions in the job office of the Republican. He continued there as journeyman and foreman until 1865, when he bought out a small business—that of George Hanson. He carried on business by himself for two years, when he entered into partnership with James Tiernan, a very well-known man in St. Louis, who afterwards attained much distinction. This relation continued until the death of Mr. Tiernan, in 1887, when a joint stock company was made of the business, every stockholder except one being engaged in its labors. It has been signally successful, and is the largest establishment of the kind in the United States west of Cincinnati and south of Chicago. Mr. Woodward is interested in several financial institutions, and is very prominent in the Fall Festivities Association, which is composed of the most prominent business men of St. Louis and annually holds a great fair. Mr. Woodward was one of the original members of the Typothetæ of his city, and has been a delegate at every convention of the United Typothetæ since. In 1892 he was elected president of the body, presiding over its meeting at Chicago on the grounds of the world's fair.

WILLIAM H. WOODWARD.

Worcester.—Printing began in the city of Worcester, Mass., in 1775, Isaiah Thomas removing thither from Boston, which had grown too hot for him. He published the Spy and did job printing. His business was stopped for awhile, but began again, and at the return of peace or shortly after his office was the largest of the kind in America. Thomas had for a long time a partner in that town named Ebenezer T. Andrews. He was followed in business by his son of the same name. The Spy is still carried on, being a hundred and fifteen years old. There are three other daily and thirteen other periodicals in Worcester, besides a number of book and job printing-offices.

Worde, Wynkyn de, a celebrated printer, the successor of Caxton in England. He is believed to have been a native of Lorraine, to have assisted Caxton in printing at Bruges and to have accompanied him to England. De Worde continued with Caxton, and succeeded to his business, printing for some years in Caxton's own house. In a work printed in 1491 De Worde mentions the death of Caxton, and also the patronage extended to himself by Queen Margaret, the mother of Henry VII. Immediately after Caxton's death De Worde cut a number of new and remarkably excellent fonts of type, not only for himself but for other printers. In 1528 he published a work in Roman character, with marginal notes in Italic, which book contained the first Greek ever printed in England, it being in movable type, while the Arabic and Hebrew were cut in wood. De Worde printed four hundred and eight books, generally using the device of Caxton with the addition of his own name. He died in 1534.

Work and Turn.—At handpress, when the sheet is printed on one side and then turned over and worked on the other side, each sheet therefore making two complete copies. This is also known as half-sheet work.

Worked.—A synonym for printed.

Worked Off.—Any form or sheet printed off.

Worked-off Sheets.—One or two copies of any work laid aside when printed for reference purposes.

Working by the Piece.—Workmen paid in accordance with the amount of work that they do. This is ascertained by measuring the quantity of type set.

Working in Pocket.—A term applied to men working in companionships, where each have equal advantages. The work done by all of them is measured together and then divided equally, except when the make-up or some other hand or hands have previously agreed for a larger percentage of the money to be received. Work is very rarely done in this way in any city of America.

Working on Lines.—A compositor on piece-work paid by the number of lines composed. This is purely an English expression. Compositors in America are never thus paid.

Working on Time.—Workmen employed and paid by the hour, day or week—distinct from piece-work.

Working Without a Figure.—When the proof was corrected and the form was ready for press, in Stower's time, a figure was marked at its foot which showed for all time which press the job was to be worked on. Working without a figure was finable.

Wove Papers.—Papers which do not exhibit wire-marks crossed in making—distinct from laid papers.

Wrapper.—1. A cover, of paper, to a pamphlet or similar work. 2. A sheet for wrapping or mailing.

Wright, Albert Judd, long the State printer of Massachusetts, was born at South Hadley, Mass., in 1818. His father died when he was six years old, and he was adopted by an uncle who was in the printing business in Boston. He was kept at a public school until he was fourteen, but helped in the office mornings and afternoons. When he was sixteen years old his uncle sold one-half of his office and left the other half in his charge. The business was music-printing. After several years had been spent in this way Mr. Wright returned the office to his uncle and went into business on his own account,

ALBERT JUDD WRIGHT.

which soon became large. In 1854 he was elected to the House of Representatives, and in 1855 to the Senate of Massachusetts. He had a partner while away on official duties, but becoming dissatisfied with the way in which the business was conducted had it put into the hands of a receiver. When the accounts were settled the property had gone. In 1857 he was again elected to the House of Representatives, and in 1860, as the health of the State printer at that time was not very good, that official proposed to Mr. Wright and Robert K. Potter to buy his interest. This they did under the firm-name of Wright & Potter. Twice after that time he was elected a member of the Legislature, and in 1863 or 1864 the printers of Boston and vicinity, having organized an association known as the New England Franklin Club, Mr. Wright was elected the president, to which position he was re-elected three times. The firm is still in existence.

Wrinkling.—An uneven surface in a book, caused by not being properly backed or pressed, or occasioned by dampness.

Writing.—The expression of ideas by pen and ink, by pencil or other means, when the characters are traced by hand. It is believed to have originated in pictures, some of them, by long association, finally coming to represent certain sounds. Among the Egyptians and the Mexicans ideas which were not the primary ones of the pictures were thus represented, and Sir William Johnson, in his account of the Indian tribes of the colony of New York, shows how this was done by the Iroquois. Only one example of the invention of characters for a language by a person who had not been taught elsewhere has occurred in historic times—that of the Cherokee tongue, by Guess. Missionaries and travelers have frequently reduced to writing a language which had before not been written, but they had been thoroughly trained in writing in their own language. After writing has begun at the present day among savages it is not long before it is reduced to print. Many languages which were once written are now dead, and the number of those which have been lost within a few years is very great. No Indian language is now spoken in New England except, perhaps, in the north of Maine, although six or eight have been written, and there are few in the eastern part of the United States which survive. The tendency is for the greater languages to efface the less. Many of the minor languages, such as Breton or Irish, have enough printed for ordinary needs were one of the natives to require the use of elementary books; others, like the Portuguese, have a sufficiency of literature for all except the learned. Yet if a Portuguese desires to study Sanskrit, or ethnology, or the higher mathematics, he must resort to English, French or German as the medium through which to acquire it. He might perhaps make shift with Dutch, Italian, Spanish or Danish, but he could not descend to the very bottom except in the three languages mentioned. Thus there is a tendency among the learned everywhere to learn these tongues, and when they have anything of importance to say to write it in one of them. There is now an educated class in each of six or eight countries who are professional bookmakers, absorbing the knowledge of the times and expressing it in a clearer or a different form.

The writing done by the ancients did not cover as wide a range as ours. It is not probable that the whole of the books written before the downfall of the Roman Empire equaled in volume those of Wales or Finland at the present day, the methods of expression and preservation being entirely inadequate to the needs of thought. The first writing was with a reed, upon leaves or glutinous reeds, split apart. The ink was unsatisfactory, and the forms of the letters were neither easily written nor read. In the Roman scrolls found at Pompeii and Herculaneum the manuscripts were in capitals, and there was no punctuation and no division between the words. Later better materials came in, but although a running hand was known it was not plain. This changed from age to age. Handwriting in America has altered materially within a hundred years, and except professed scholars no Englishman or Frenchman of to-day can read the handwritings of the time of Henry VIII. or Louis XI. There are professors of paleography in European universities who teach the art of deciphering ancient manuscripts. The characters in printing were originally made in close resemblance to the manuscripts of the day, but have since been altered both in idea and for compactness and regularity. It is impossible for the best penman to write with rapidity and form all of his letters with perfect exactness. By having an exact model for each letter, and giving no more space to beginnings or endings, or ascending or descending letters, than is necessary, very many more words can be put in a given space. In the manuscript in which this book is written there are fifteen lines in nine inches, and a page contains one hundred and one words. If the page were to be set in type that would comprise just as many words in the same space, the size required would be double paragon, in which one letter is as large as seven of the ordinary size used in books.

Writing-Paper.—Paper of a better and harder nature and more highly sized than that used for book or newspaper printing. It is thus made to adapt it to writing purposes.

Writing-Parchments.—The selected parchments adapted for writing purposes.

Writing-Vellums.—Fine and selected vellums for writing purposes.

Wrong Font.—Letters of a different character or series mixed with another font, although perhaps of the same body. The mark for this is wf. or w. f.

Wrought-Iron Chases.—Chases made of wrought iron—distinct from cast-iron. All large chases are thus manufactured.

Wyoming.—One of the Western States of the American Union, located along the Rocky Mountains. Printing has been practiced there at least since 1867, the Cheyenne Leader having been founded then. In 1880 there were 11 newspapers, 3 being daily. In 1893 there were 43 periodicals, 5 being daily and 38 published at intervals. Cheyenne and Laramie are the chief towns.

X

X THE twenty-fourth letter of the alphabet, is rarely used. It is a little thicker than an en quadrat. It denotes ten in the Roman method of notation. It is much used in algebraic calculations. Between two figures it signifies by, as 26x40. It is used as a signature by people who cannot write. On newspapers it is sometimes used as an arbitrary mark to indicate that a line must be set larger than the rest of a take, as in nonpareil copy the first line to go in minion. Xn means Christian, Xmas Christmas, and Xt Christ. The Greek letter of this form indicated ch.

Xilografia (Sp.).—Xylography, printing from engraved wooden blocks.

Xylonite.—A material beginning to be used in bookbinding, closely resembling celluloid in composition. It may either be flexible or stiff, smooth or rough. It is highly inflammable in contact with fire, yet stands a moderate degree of heat elsewhere.

Xylography.—A term borrowed from the Greek, meaning writing on wood. As commonly used it means that method of printing in which a single block in relief is used, instead of many small blocks or letters in relief, which is typography. The block-books which preceded the invention of printing were xylographic, and as afterwards used any design or lettering cut upon wood was meant by this term. It was, however, used for many years in America to denote the quality of work done upon labels for perfumery and other trades. The idea came from Paris about 1830. "The distinctive style of the engraving is that of the geometric lathe, at first applied as an ornament to watch-cases and afterwards extended to fine-grained wood, and then to printing-plates of copper, steel and type metal. Its structure is composed of circles and other curves, and arcs of these, intersecting by an exact, graduated change of centre, by the passage of the surface under a fine steel point, thus producing figures of great beauty, suitable for borders and damask groundwork and endings for checks and drafts. It has reached its highest application in our present national currency. Its original use in this country was chiefly due to Edmund Morris of Philadelphia, whence the work was dispersed almost throughout the continent in labels, show-bills and commercial blanks. It is adapted properly to fancy-colored inks, its lines being too heavy for black inks; but no other style of ornamental printing embraces such capacity for critical accuracy coupled with almost kaleidoscopic variety. The execution of the printing requires skill and judgment, the contrasts of the surface demanding difference of treatment as to quantities of both color and impression, in securing which exact overlays on the tympan are the surest resource. It could not have preceded the invention of the elastic inking-roller, the skin balls being entirely inadequate for the purpose. The hardest stereotype castings, taken from the originals of softest type metal, are preferable for work in general; electrotypes give finer lines and have other valuable points, when backed up sufficiently to stand the heavy pressure; but precaution must be taken to prevent them from spoiling all varieties of vermilion colors. Xylographic printing is now supplanted to a great extent by lithographic work."—*Ringwalt.*

Y

Y THE twenty-fifth letter of the alphabet. It occurs in the medium order of frequency, and is a little thicker than an en quadrat. It signifies as a numeral 150. In the plural y, unpreceded by a vowel, changes to ies; but when there is a vowel before it it merely adds an s.

Yapp.—Yapp binding consists of a limp cover projecting, similarly to a circuit, half the thickness of the book over the edges on both sides, so that the flaps by meeting protect the edge. It differs from the circuit in that it has no stiffening, and is therefore perfectly pliable, and the flaps are not cut either at the corners or at the back. The best yapps are kid lined, the lining being joined to the cover with a solution of India-rubber.

Year-Book.—A work published annually, such as a report of the occurrences and statistics of the year relating to a country, art, science or religious belief, and intended to be used as a book of reference.

Yellow Wove.—A cheap kind of colored wove paper, but anomalously blue in shade.—*Jacobi.*

Yellow Edges.—Books cut and colored yellow at the edges.

York.—This city, in England, after which New York was named, was one of the earliest in that country in which printing was practiced. Hugo Goes, supposed to be a Dutchman, printed a work here in 1509. It was in this place that Thomas Gent wrote his reminiscences.

Z

Z, THE last letter of the alphabet, is little used. It is a little thicker than an en quadrat. As a numeral it signified 2,000 among the Romans. The position of z is not invariable in the case. It is often transposed with x, also a letter little used. The transposition of infrequently used letters is very common.

Zaehnsdorf, Joseph, the great London bookbinder, died in that city at the end of 1887, aged seventy-two. He was born at Pesth, in Hungary, in 1815, and after serving his traveling apprenticeship at Vienna and Paris went to London, where he arrived in 1837. He was first with Wesley & Co., and then with Mackenzie, two of the best binders in the city. In 1842 he began business on his own account, and gradually attracted much custom of the best class. He obtained honorable mention at the first world's fair in London, and medals at the Crystal Palace in 1865; Paris, 1867; Vienna, 1873; and South Kensington, 1874.

Zarot, Anthony, the supposed inventor of signatures. It is now well known, however, that the practice did not originate with any particular printer, but was known long before the art was discovered, as it was necessary for scribes to mark what they had written so that binders need make no mistake. Zarot began the printing business in Milan, Italy, in 1470, and the commonly received account says no other printer was known to have used signatures before the appearance of his edition of Terence. He continued printing until 1500, when he is supposed to have died.

Zell, Ulric, a printer of Cologne, among the first who learned the art. His name is frequently mentioned on account of the direct testimony he gives in favor of Gutenberg being the inventor of typography, and for an incidental mention of a previous practice, much less skillful, in the Low Countries.

Zenger, John Peter, a printer, of New York, was born in Germany and came from the Palatinate of the Rhine to this country in 1710 with his mother, Johanna Zenger. He was then aged thirteen. On October 26 of that year he was apprenticed to William Bradford, the earliest printer of New York, by Governor Hunter. It is probable that his time ran until he was twenty-one, which would be in 1718. He had apparently received the rudiments of an education better than common, and he improved his opportunities, becoming on the whole a better workman than Bradford, although never entirely accurate in his English. He began a printing-office in 1726, according to Thomas, but in 1725, in conjunction with Bradford, he published Frilinghausen's Klagte van Eenige Leeden. During his first year alone he published several pamphlets. He was originally in Smith street, but in 1734 removed to Broad street, near the upper end of the Long Bridge. In 1733 he began the second newspaper in New York, which was entitled the Journal. It appeared with a date line, Monday, October 5, which was a whole month wrong, the true date being November 5. The price was three shillings a quarter, which, reduced to specie from the New York currency, was at the rate of a dollar and a half a year. It was founded in opposition to Governor Cosby's administration. Rip Van Dam had been acting governor during an interregnum in the office, but when he was relieved by Governor Cosby the latter sued him for half his fees. Much bitterness was occasioned. All of the leading men were arrayed on one side or the other, and the ablest lawyers supported Van Dam and Zenger. The governor arrested the printer for libel, and threw him into jail on Sunday, November 17, 1734. There he remained for many months. His paper was ordered to be burned by the common hangman; but as the corporation of the city refused to direct him to do so the order was executed by the sheriff's own negro. The specific thing charged as a libel was, in substance, "the people of this city [New York] and province think, as matters now stand, that their liberties and properties are precarious, and that slavery is likely to be entailed on them and their posterity, if some past things be not amended." The mayor and magistrates refused to join against Zenger, and so did the Provincial Assembly. The lawyers retained for the defense excepted to the constitution of the court, which they regarded as irregular. This the presiding justice took as a personal insult, and the counsel were thrown over the bar. The governor and judges were determined to convict. In this emergency, as there were no lawyers of any considerable ability remaining in New York, Zenger's friends engaged the most celebrated Philadelphia lawyer, Andrew Hamilton, to conduct the defense. The publication of the article was confessed, but it was denied to be a libel. Mr. Hamilton offered to prove that the assertions were true, but the court declined to permit this. It maintained that as the publication was admitted the libel was admitted, and that the jury had nothing to do except bring in a verdict of guilty. This Mr. Hamilton refused to admit, and argued as a point of law that such a decision could not be supported. This he maintained in a speech of remarkable ingenuity, really intended, however, for the public. It dwelt very little upon the law, but was an extremely eloquent appeal founded upon the principles of justice which apply to all men. It produced a great and long-enduring effect. He maintained that to be a libel a statement must be untrue and must also be injurious. The attorney-general was overmatched, and neither he nor the presiding justice was able to refute the arguments advanced by Hamilton, nor to silence him. The jury were convinced and brought in a verdict of not guilty, although against the express charge of the court and against the entire previous current of English decisions. Their verdict was substantially that the truth was no libel, and was the first assertion of a truth which is now regarded as axiomatic in America. There was no further prosecution of Zenger, although pretexts might no doubt have been devised to do so, and he continued the publication of his paper and the prosecution of his printing business until his death, in 1746. His journal was then carried on by his widow, Catharine Zenger, until December, 1748, when she resigned its publication to her son, John Zenger. He continued the work until about 1752.

Zinc Galleys.—Receptacles on which type is placed, used for slip and newspaper work. They have been little employed in America except for distributing galleys and for galleys in which type was washed with boiling lye.

Zinc, Printing On.—Plates of zinc are drawn upon and printed from by a process similar to that employed in lithography. Zinc is also used for much of the material in relief plates, employed in a similar way to woodcuts. Such cuts are cheaper than wood engravings.

Zinc Rules, both plain and ornamental, chiefly for newspaper and poster work, are now made in England. They are said to be equal in appearance to brass, and their cost is only about one-third of rules in that metal. Zinc and type metal are both employed largely for this purpose in France, and very little brass is thus used.

Zinco.—A short term much used in England for zincograph process blocks.

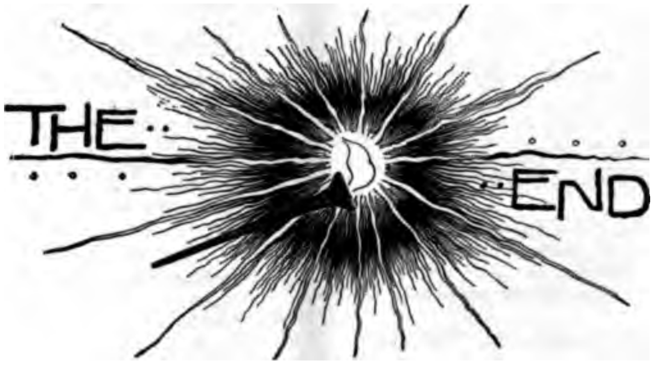
Zincography.—Printing upon zinc, much used as a substitute for stone in lithographic processes, but also employed in photo-engraving.

Zincotypes.—High relief plates for typographic printing. The zinc is coated with bitumen or with bichromatized albumen. It is then exposed under a negative and subsequently developed. The bitumen picture is developed with oil of turpentine. The bichromatized albumen is first coated with printer's ink, then developed by gently rubbing in cold water with a tuft of cotton. By suitable etching agents the whites are dissolved away, leaving the picture in high relief. The Ives process, invented by F. E. Ives of Philadelphia, in 1881, is a most ingenious process for producing half-tone negatives for making relief blocks. The picture is converted into a series of dots of varying sizes. The Meisenbach negative was devised by G. Meisenbach of Munich, in 1882, and is available for many different photo-mechanical processes. William Kurtz of New York is the inventor of a process of similar character, which gives very fine results.

Zurichtung (Ger.).—Making ready.

Zuschrift (Ger.).—The dedication.

Zwiebelfische (Ger.).—Pi.



ADDITIONS AND CORRECTIONS.

Acme Cutter.—This was the first automatic self-clamping paper-cutter made. It was the invention of Charles Montague, and was produced in 1871. The back gauge is operated by a metallic band, which is spaced off in inches and sixteenths, and is moved with great rapidity. The indicator is directly under the eye of the operator, and gives the exact distance from the back of the knife to the back gauge. The round wood, by slightly revolving, presents a fresh surface to the knife each time, affording nearly fifty in all, while the square wood gives only eight. See page 7.

Acme Press.—The bed of this press has an original and very effective motion. The cylinder is small, and the machine can be operated either by hand or steam. The inventor was Charles Montague. See page 7.

Adry.—This word has now become obsolete, "ad." being used instead in familiar conversation. Its use was most largely in the neighborhood of Cincinnati and in the Southwest. See page 11.

Book-Plates.—On page 62, instead of Ex Libri read Ex Libris.

Bradford, William.—The second centennial of Bradford's introduction of the art of printing in New York was celebrated there by the Historical Society, by the Grolier Club, and by the printing trades. An oration was delivered before the Historical Society at the Cotton Exchange on April 12 by Charlton T. Lewis. The address was learned and eloquent. The Grolier Club gave an exhibition of early printed American books, the largest and most noteworthy ever brought together. It included the first work of Bradford's press in Philadelphia, the New York Laws and the Prayer-Book of 1710. The allied trades, including printers, bookbinders, electrotypers, engravers, paper-makers, stationers and other occupations gave a banquet at Delmonico's, which was very largely attended and at which two of the descendants of William Bradford were present. See pages 66 and 67.

Bruce, David, Jr., closed his long and useful life in Brooklyn on September 13, 1892, aged ninety. He was a punch-cutter, type-founder and printer, and invented the first practicable type-casting machine. See page 73.

Childs, George William, died on February 3, 1894, being then nearly sixty-five years old. Anthony W. Drexel, his friend and partner, who joined with him in the presentation of a sum of money to the Printers' Home, in Colorado, also being dead, the management of the Philadelphia Ledger passes into the hands of George W. C. Drexel. It is understood that Mr. Childs made no provision for charities in the future, as he gave what he could afford for this purpose in his lifetime. See page 95.

Color.—The work on Color-Printing by John F. Earhart, mentioned on page 105, has appeared and is of great value. Another book, by W. D. Richmond, issued in England, is valuable in its analysis of inks, although mostly intended for lithographic printers.

Colt's Armory Press.—See John Thomson.

Cottrell, Calvert B., the printing-press manufacturer, died at Westerly, R. I., on June 12, 1893. See page 121.

Dutch.—In line 12, page 152, instead of Professor Marsh read Professor March.

Lightbody, John G., an ink manufacturer, should have his name thus printed on page 340, instead of John E. Lightbody.

Mame, Alfred Henri Amand, an eminent printer of Tours, in France, was born in 1811. He learned the printer's art with his father, Alfred Mame, who had begun business in 1796. He became manager on attaining his majority, and sole proprietor in 1845. The business is exceedingly large. Six millions of volumes are turned out each year. The grounds cover five acres, and eight hundred persons are employed. The products are of two classes—works of art and publications of a general nature. In the former his work has been of the best, and his other productions have been very cheap but well made. He always refused to print a single line contrary to the strictest rules of morality. There are free schools, a co-operative bake-house, and an institution for the gratuitous supply of medicine to the work-people of the firm. The profits are divided with the work-people, and there is an annuity fund. M. Mame died on April 12, 1893. See page 363.

McFetridge, John R., of Philadelphia, was elected president of the United Typothetæ at its meeting in Chicago in 1893. See page 354.

Mitchelson, David, the first type-founder in Boston, was a seal-engraver from London. He came over with his wife in the same vessel with Robert Sandeman, in August, 1765, and for a while was in New Hampshire. The Sandemans suffered from great persecution, their faith being very unpopular. Nothing is known of his life after his type-founding experiences.

Paper.—The second paper mill built in the United States was that of William De Wees, a brother-in-law of Klaas Rittinghuysen (or Rittenhouse). It was erected at Crefeld, in Philadelphia County, Pa., during the year 1710. The third mill was that of Bradford at Elizabethtown, N. J. Two other early mills were established in Pennsylvania. One was built by Thomas Willcox in 1729 near Chester, in Delaware County, and the other by the Dunkards at Ephrata, in Lancaster County. On October 24, 1827, the manufacture of paper by the Fourdrinier machine began at Saugerties, N. Y. This is said by those who have made the matter a study to be the first use of the Fourdrinier machine in America. See page 418.

Reed, Talbot Baines, the type-founder, died on November 28, 1893, after a long illness. He will long be remembered by his exhaustive work on the Old English Letter Foundries. He also edited Mr. Blades's Pentateuch of Printing, and published several pamphlets, all upon the art. See page 486.

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